MOTORCYCLISTS

IMAGE AND REALITY

EDITED BY
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PREFACE

Our main thrust in this volume has been to denote and elucidate a source of information on motorcyclists—a source which we believe is particularly rich with data about characteristics, images and everyday social behaviors. We made efforts to open out and enlarge our empirical space beyond the relative closed systems of statistical designs. That is not to say, we attempted to pre-empt statistical analyses, rather we joined forces with them.

Descriptive statistics and multivariate analyses told us about the difference between formally trained and untrained motorcyclists. We considered the findings of a survey, which was answered by two sample groups representing trained and untrained motorcyclists. Also, we compared the groups as they are represented in the provincial motor vehicle accident database. Many interesting findings emerged. But, we needed more. We could not hold steadfast in the belief that the statistical descriptions told us all there is about motorcyclists. To bring greater coherence to our findings we engaged in a participant observation of a motorcycle training course. The in-depth description of "what went on with students, instructors and motorcycles" provided us with a clearer insight as to the meaning of the category—formally trained motorcyclists. Still we were left with several important questions. What is the phenomenon on the streets called motorcycling? How do motorcyclists envision themselves as members of society when they do what they do? After all, it is how and why they act that leads to motor vehicle accident statistics. Not to deny this relevant area of data, we engaged in a series of in-depth interviews with motorcyclists and related their views to social theory. We intersected the different forms of data through an emic, mid-range, and etic conceptual design. As a result, the curtain was raised on a broadened portrayal of motorcyclists—one that joins the statistical findings with everyday behavior.

With the incorporation of alternate research perspectives we offer a balance of the theoretical and the empirical. By doing this we continue the sequence that was initiated in our first book, "Rethinking Young Drivers." We hope that the description, quotations, statistical findings and conceptual formulations will broaden a previous narrow version of motorcyclist reality. For, as Koestler wrote:

". . . Einstein's space is no closer to reality than Van Gogh's sky. The glory of science is not in a truth more absolute than the truth of Bach or Tolstoy, but in the act of creation itself. The scientist's discoveries impose his own order on chaos, as the composer or painter imposes his; an order that always refers to limited aspects of reality, and is based on the observer's frame of reference, which differs from period to period as a Rembrandt nude differs from a nude by Manet." (Arthur Koestler, The Act of Creation.)

North Vancouver, B.C.
August, 1987

Peter Rothe and Peter Cooper

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The help of several individuals and organizations aided in the completion of this book. Data on motorcyclists' crashes and violations were obtained with the co-operation of the British Columbia Motor Vehicle Department. Interviews with motorcyclists consisted, in part, of a radio open-line show organized by CKNW radio, Vancouver, British Columbia, and hosted by Terry Moore. Brian Lowes, Program Manager, British Columbia Safety Council invited researchers to observe their motorcycle rider training course. The contribution made by the British Columbia Motor Vehicles Department to the research was significant.

The canonical analyses were completed with the assistance of Dr. Michael McRae, W.S. Sharpe and Associates. Byng Leong provided editorial assistance during the development of the manuscript. Mario Pinili organized the data suitable for analysis and interpretation.

The contributions of these individuals and organizations are gratefully acknowledged.

Born to be Wild

Get your motor running
Head out on the highway
Looking for adventure
In whatever comes our way.

Yeah, darling, gonna make it happen,
Take the world in a love embrace
Fire all of your guns at once and
Explode into space

I like smoke and lighting
Heavy metal thunder
Racing in the wind
And a feeling like I'm under

Yeah, darling, gonna make it happen,
Take the world in a love embrace
Fire all of your guns at once and
Explode into space

Like a true nature child
We were born, born to be wild
We have climbed so high
Never want to die.

Born to be wild
Born to be wild
Born to be wild

"BORN TO BE WILD"

Words and Music by MARS BONFIRE

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TABLE OF CONTENTS

	PAGE
PREFACE	i
ACKNOWLEDGEMENTS	iii
CHAPTER 1: MOTORCYCLISTS: THE CONCEPTUAL BASIS by J.P. Rothe	
Introduction	3
Conceptual basis of the study	5
Overview of emic, mid-range and etic	6
The emic, mid-range and etic of motorcyclists	7
Combining emic, mid-range and etic	10
CHAPTER 2: MOTORCYCLISTS: A LITERATURE REVIEW by S.K.F. Fockler	
Preface	15
Introduction	15
Driver training programs	15
Training versus education	16
Driving skills versus driving decision-making	17
Weaknesses in program development	18
Weaknesses in program evaluation	18
Driver education participants: Self-selection principle	21
Motorcycle rider education programs	22
Magnitude of the motorcycle accident problem	23
Characteristics of motorcycle accidents	24
Characteristics of accident-involved motorcycle drivers	25
Characteristics of motorcyclists versus non-motorcyclists	26
Evaluations of motorcycle rider education programs	27
Summary of major evaluation findings	30
Conclusion	32

PAGE

CHAPTER 3: MOTORCYCLISTS IN EVERYDAY LIFE: SEEN-BUT-UNNOTICED FEATURES
by J.P. Rothe

Introduction 35
Data 35
The etiological question 36
Self and others 39
Motorcyclists as social organization 42
Motorcycles and aesthetics 45
Safety and motorcyclists' reality 49
Summary 54

CHAPTER 4: A MOTORCYCLE RIDING COURSE
by J.P. Rothe

Preface 59
Introduction 59
Methodology 60
Situational studies 60
Section I Description of participant involvement 62
Preliminaries 62
Novice rider course—day 1 63
Novice rider course—day 2 68
Novice rider course—day 3 72
The traffic skills course 74
Section II Analysis of observations 78
The novice rider course 78
The traffic skills course 83

CHAPTER 5: A SURVEY OF CHARACTERISTICS AND ATTITUDES OF MOTORCYCLE TRAINING COURSE TAKERS AND NON-TAKERS
by P.J. Cooper and S.K.F. Fockler

Preface 87
Introduction 87
Methodology 88
Study design 88
Population and sample 89
Information sources 92

PAGE

Driver record coding 92
Data manipulation 93
Analysis of rider characteristics 97
Demographics 97
Rider training and licensure 100
Riding exposure 107
The "average" British Columbia motorcycle rider . 138
Factors related to past accidents and convictions .. 140
Factors differentiating trained from untrained riders 150

CHAPTER 6: MOTORCYCLISTS AS REPRESENTED IN THE ACCIDENT DATA
by P.J. Cooper

Introduction 159
Data organization and analysis 160
The database 160
Basic rider/vehicle characteristics 161
Rider/accident situational factors 174
Factors jointly affecting rider accident and violation history 180
Summary and discussion 188

CHAPTER 7: SUMMARY AND RECOMMENDATIONS
by J.P. Rothe and P.J. Cooper

Characteristics of motorcycle riders 195
Factors affecting conviction and accident history .. 196
Factors differentiating trained from untrained riders 200
Recommendations for intervention strategies 201
Motorcycle rider training programs 202
Public awareness 203
Motorcyclist awareness 204
Helmets and other protective gear 204
Engine size 205

LIST OF FIGURES 207
LIST OF TABLES 208
BIBLIOGRAPHY 210
GLOSSARY 220

CHAPTER 1
MOTORCYCLISTS: THE CONCEPTUAL BASIS

J.P. Rothe

Introduction

Consider the following rationalizations concerning motorcycle riders. Each account holds a set of values which guides a perspective:

1. Motorcyclists are natural risk-takers who drive dangerously with no concern about their own or anybody else's safety.
2. Motorcyclists are ill-prepared to handle a powerful, dangerous machine like a motorcycle.
3. Motorcyclists place themselves in dangerous positions because they lack the training to anticipate problems and they are easily overlooked by other motorists.

There is much interest in the reasoning of all the descriptions listed above. It is not unusual to find a news article on motorcyclists which touches on one or more of the above rationalizations.

We, at the Traffic Safety Planning and Research Department, became interested in motorcyclists and in the variety of perspectives ascribed to them. Often debates on motorcycling turn to motorcycle training programs and the need to enforce enrolment in them prior to receiving a driver's licence. With training, the argument goes, motorcyclists will be better able to judge road conditions, to anticipate problem areas, to learn appropriate skills in handling a motorcycle, and to appreciate the necessity for safe driving.

We were left with a major problem area. In a rather simplified version we concentrated on one key question. To what extent are motorcycle driver training program participants different from non-participants? Of secondary interest were the questions: how do program participants differ from non-participants in demographic and personal characteristics and how do their respective traffic violation rates and accident involvements differ?

To answer these questions we engaged in a yearlong research project. This volume describes the study in depth. It entails six major parts. Although each part builds on previous sections to a considerable degree, they each have different purposes. At the same time the combination of all the components presents a holistic picture of motorcyclists' characteristics in terms of motorcycle driver training participants and non-participants.

In chapter 1, Peter Rothe introduces the social anthropological framework of emic, mid-range and etic. His outline served as the pillar for the development of research strategies. The presentation relies heavily on anthropology and phenomenological sociology.

Before delving into the research, we recognized the need to review previous motorcycle studies and conceptual definitions. In chapter 2, Sylvia Fockler engaged in such a comprehensive literature review. Fockler's analysis of the literature provided insight into the "state of the art" on motorcycle research. Her broadly based text presented us with an orientation of what kind of research "has been done," "could be done" and "should be done."

Next, there is a need to describe how motorcyclists' ideas and activities emerge and are sustained. To answer the requirement, Peter Rothe developed chapter 3 as a way of "seeing" motorcyclists at the commonsense level. He presents a description on the public character of motorcyclists; one that serves as the ground cover for the statistical exposés.

Chapter 4 focuses on the social contexts and experiences of a motorcycle driver training course. As a participant observer, Rothe recounts his observations and interviews and details how they impact students. As an intensive participant, Rothe gathered observational data through personal involvement and direct statements made by other participants.

Chapter 5 is organized around a telephone survey of motorcycle driver training program participants and non-participants. This component of the book was considered to be the mid-range. Cooper and Fockler detail the statistical differences between the two groups pertaining to personal and driver characteristics and points of view. Through a challenging multiple regression (canonical correlation) analysis they further interpret the characteristics of each group, by traffic violation and accident records. This chapter provides the reader with an in-depth sense of differences between motorcycle driver training participants and non-participants.

In chapter 6, a broad analysis of all British Columbia motorcycle accidents which occurred in 1984 was undertaken. This section of the book is the etic. Peter Cooper introduces a set of analytical categories and proceeds to interpret the accident data accordingly. This section features all motorcyclists involved in an accident and also examines variables in the overall rider population which are associated with higher accident and conviction rates.

Finally, chapter 7 summarizes what has been discovered in the study. The purpose of this section is to highlight the findings and to set the agenda for future motorcyclist work.

Conceptual Basis of the Study

Metaphorically speaking, motorcycle riders inhabit different worlds. First they inhabit a micro world consisting of everyday, immediate experiences. Beyond that, with varying degrees of continuity, they inhabit a macro world; one involving larger social structures that are mostly abstract, anonymous and remote (Berger, 1975). For a researcher, each world depends upon the other for meaningful information. According to Berger:

> The micro world and what goes on in it only makes full sense if it is understood against the background of the macro world that envelopes it; conversely, the macro world has little reality for us unless it is repeatedly represented in the face-to-face encounters of the micro world (1975, p. 8).

In a motorcycle training course the activities and structures derive most of their meaning from their being experienced as part of the enveloping process of driver training; conversely, driver training would remain a vague idea with little reality unless it became part of immediate experiences with others in a face-to-face situation.

Similarly, for the researcher, constant awareness must be instilled that the particular research study interpenetrates research methodologies, academic disciplines, and life philosophies. Conversely, findings in particular research studies may align themselves to acceptable research paradigms or they may realign themselves to broad research interests (St. Clair and Giles, 1980). So, for researchers to fully understand motorcyclists they must constantly be aware of the two-fold manifestation of the phenomena, the microscopic as well as the macroscopic.

The central research question for this study was: "to what extent is the motorcyclist who has no formal driver training different from the one who has?" To answer this question the following postulate outlined by Schutz served as a guide:

> The basic postulate of the methodology of social science must be the following: choose the scheme of reference adequate to the problem you are interested in, consider its limits and possibilities, make its terms compatible and consistent with one another, and having once accepted it, stick to it (1965).

Consistent with Schutz's postulate, an eclectic framework was designed which served as the basis for the research. The framework is entitled emic, mid-range and etic.

Overview of Emic, Mid-range and Etic

The concepts of emic and etic were borrowed from the anthropological linguist, Kenneth Pike. The concept, mid-range, was first considered by Merton. The emic approach fits with the micro-world identity. It is concerned with the discovery of human behaviors that occur in different social situations. In 1909, Thomas described that peoples' behavior in different social situations were a central concern for sociological theory building. Therefore, it was paramount that researchers gather data on peoples' functions and roles and attitudes of self and of groups. Since social situations were created, it was preferred that researchers uncover the definitions of situations, which were shared by actors and objective environmental elements bounding the social behavior.

According to Geertz (1973), an emic analysis is closely tied to concrete social events and occasions. It shares the podium of relevance with Berger's (1975) concept of micro world, Simmel's (1971) designation of social forms, and Thomas' recognition of social situation. Emic, like the conventional linguistic usage of phonemic, is a viewpoint which directs the researcher to understand relevant events and behaviors from inside a system.

The mid-range perspective features "general knowledge" about a group studied, particularly about how people perceive, interpret and document their activities and behaviors. Researchers ask people questions that restrict the respondents' frame of possibilities. They only allow for specific answers within a defined context. For example, questionnaires with fixed-choice response categories are typically used in survey research. Because of their rigorously defined structures they preclude the possibility of obtaining unanticipated definitions that respondents may have of the situation. However, questionnaires provide data through standardized modes of inquiry, which detail empirical regularities and trends about social action. Statistical patterns are established to serve as general knowledge about cohorts. In a mid-range typology, social actions are described according to concepts which relate to inner experiences, but are defined according to outer categories. Researchers have one foot in peoples' definitions of behaviors, and the other foot in empirical designs.

The etic perspective is further removed from the social situation. Here, researchers construct schemata for looking at data. They direct their attention to a distribution or set of distribution of counts and make inferences about the social forces which could have produced them (Cicourel, 1964). The constructs are derived from sources external to

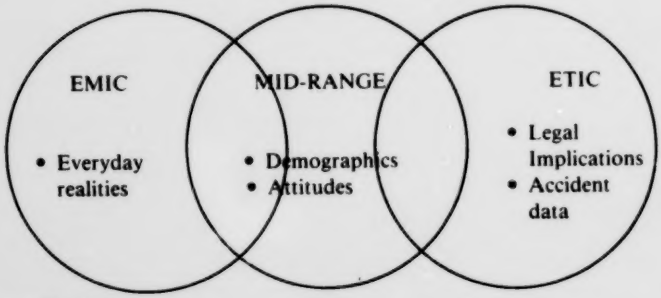
the phenomena and previous to their investigation (Green and Wallat, 1981). According to Pike (1954), for an etic approach the analyst "stands far enough away" from a particular cohort to see its separate events through use of phenomenal distinctions and sub-classifications.

Whereas emic corresponds to the micro world of human activities, the mid-range extends from the micro to the macro worlds, the etic relates entirely to the macro world of social events. It serves as a statistical reconstruction of events from a secure distance. Although the real distinctions between emic, mid-range and etic are not always as clear as the simplified construction presented, the outline does provide a practical framework for structuring motorcycle rider research.

The Emic, Mid-range and Etic of Motorcyclists

The social phenomenon under investigation in this study is motorcycle riding. Our interest is subdivided according to participants in formal motorcycle rider training courses, to non-participants of rider training, and to the overall characteristics of motorcycle riders. Figure 1 illustrates these ideas.

Figure 1
The Emic, Mid-range and Etic



A. Emic:

A key research query for this study is to identify similarities and differences between motorcyclists who had experienced and had not experienced motorcycle driver training courses. Hence, the emic perspective is of relevance to everyday riding behavior and to motorcycle training courses. For everyday behavior, the intent is to review sense-making risks that influence motorcycle

riding behavior. For a motorcycle training course, the purpose is to analyze a course's commonsense rules that underlie student and instructor conduct, meaning, and patterns of operation. From the emic perspective, it is important to recognize the significant subjective meanings and rules of conduct that exist on the road and within the micro world of motorcycle training. The accounts are designed to be intelligible to the students and trainers. The textual description may provide accounts of "seen-but-unnoticed" behavior which may unwittingly be crucial turning points for explaining motorcyclist characteristics generally, and course practices specifically.

Mode of Understanding

The purpose of understanding within the emic perspective is to describe social behavior whether it be on the street or in a training course. Understanding is translated as "Verstehen" or interpretive understanding whereby human intentions and meaningful actions are investigated (Weber, 1949). The "facts" of emic research are the participants' reasons for participating in activities, their behaviors, their views of self in life dramas, their attempts at mastery of skills, and their participation in actions vis-a-vis relationship with others.

In short, what are the motorcyclists' behaviors that are oriented towards the everyday construction of riding or towards participation in a motorcycle rider training course?

View of Reality

Motorcyclists on the street or in a training course make choices, set goals and create activities. They are not passive individuals acting in solo fashion. Rather, they actively participate in interactive relationships with other motorists, instructors, students, motorcycles and riding environments. The reality of a motorcycle training course, therefore, is structured around assumed but seldom-questioned relationships amongst students, between students and instructors, and between students and machines, roadways and physical obstacles. Similarly, the reality of motorcycling on the street is structured according to such socially relevant features as personal image, meaning of riding, views of others and group affiliation.

B. Mid-Range: Motorcycle Rider Characteristics

Motorcycle rider characteristics from a mid-range perspective may be pictured as a grey area between the emic and etic. For our research study, the mid-range is closer to the etic than it is to the emic. That is, a readily administered, tightly structured survey instrument was developed to ensure specific statistical analyses. Although the questionnaire items reflected respondents' experiences and biographies, still, they were "frozen" slices of hypothetically-defined propositions and situations. The findings contributed to the definition of motorcyclist characteristics. Although reconstructed, they were entrenched in riders' everyday motorcycle behaviors.

Mode of Understanding

The condition for establishing motorcycle rider characteristics was to translate data into the significant concepts that suited our particular cognate interests. When survey findings were correlated with motorcyclists' provincial driving records, an attempt was made to predict and control the motorcycle riders' characteristics. This was done to understand the relationship between driver characteristics and driver records so that an explanation could be presented. The mode of understanding falls within Merton's (1957) notion of "theories of the middle range." Merton's writings focus on the need to understand, interpret and explain data in terms of relationships between concepts and/or variables. The relationships are built on a social order that is predefined for research.

View of Reality

From a mid-range perspective motorcycle riders are "out there." Although they are separate entities, they share certain predefined characteristics as motorcyclists. Researchers construct frameworks that are meaningful to motorcyclists, yet are relevant to research design.

Motorcyclists are viewed as a defined population—members who are suitable for data collection. Their realities are "out there," in slices which may be gathered, analyzed, interpreted and explained. Individuals' responses to questions are taken as literal representations of their relationships to a variable or concept. The data are interpreted "after the fact" of the persons' actions. Nevertheless they reflect experience.

C. Etic: Aggregate Data Analysis

The etic perspective on motorcycle riders consists of analytical techniques for translating precoded data into findings which have statistical rigor and precision. The British Columbia motorcycle accident database and operator accident/violation records are analyzed according to parsimoniously defined trends and/or correlations. Predictions and propositional statements are then attempted by projecting conclusions from the given set of data.

Mode of Understanding

From the etic stance, motorcycle rider activities are understood in terms of statistical interpretations and nomothetic statements. Such statements represent abstracted causal or correlational relationships. According to predefined analytical measures, researchers are free to slice the data in any manner which suits their particular cognitive concerns and that is authentic to the paradigm of their discipline (Silverman, 1972).

View of Reality

The etic of accidents and violations is structured on the view of reality as a natural, objective world. By using statistical techniques adapted from psychology and epidemiology, a high degree of scientific rigor and precision is assured. The world of the motorcyclist becomes an objective one in which the researcher defines the problem and employs valid and reliable analytic techniques with a minimum of subjective involvement. Rules of analysis are invoked as a filter to obscure as much as possible the researcher's implicit, commonsense knowledge.

Combining Emic, Mid-range and Etic

The original research question, centred on comparing motorcycle training course participants with non-participants, is too complex to be addressed by a single research approach. Informed eclecticism is considered to be more appropriate. That is, since we require data pertaining to different facets of motorcycle riders we need a broad approach which addresses the emic, mid-range and etic.

The eclecticism is based on levels of interpretation. The emic deals with "pre-scientific familiarities" that are meaningful in everyday life. The next level of interpretation is one whereby descriptive accounts are developed based on survey data. The survey deals with motorcyclists'

views about certain concepts and variables relevant to riding. The concepts used to describe their lives are based on appropriate survey design. Consequently, the interpretation of data for mid-range is reconstructed and somewhat removed from emic descriptions.

The final level of interpretation is the etic. Emphasis is totally on reconstructed data. Interpretation is defined within the paradigm of "normal science" (Kuhn, 1970). Since the social world of motorcyclists is assumed within normal science to have no intrinsic meaning, the data are translated into significant concepts found in such disciplines as psychology, epidemiology or sociology. These thought constructs are interpreted into explanations. The etic approach provides the most reconstructed level of interpretation.

To establish the most useful approach, a research strategy was designed to contact all three levels of interpretations. Pike's emic and etic approach joined by Merton's mid-range provided us with the conceptual apparatus to tap into the different levels of interpretation and data reconstruction.

CHAPTER 2
MOTORCYCLISTS: A LITERATURE REVIEW

S.K.F. Fockler

Preface

Before any serious investigation on a traffic phenomenon is undertaken, a comprehensive review of existing literature is necessary. Not only does it display the strengths of past research design and relevant findings, but also it shows us where pieces of a puzzle need to be addressed. In fact, it may indicate that alternative puzzle-solving paradigms are required for certain queries.

Introduction

The motorcycle has become a symbol of today's industrial culture: mass consumption and modern advertising. Ideas of progress and development measured by changes in the machine have penetrated the consumer psyche. Over the last ten years the motorcycle has no longer been merely an idiosyncratic mode of transport reserved for deviant gangs but has become an artifact of multidimensional significance. Power, freedom, touring, fuel efficiency and overall cost became advertising idioms woven into the web of daily life. The motorcycle became special, almost lifelike as expressed in a frequently spotted bumper sticker, "Have you hugged your motorcycle today?" (English, 1982).

With the arrival of Japanese motorcycles and most recently all-terrain vehicles came advertising campaigns which whetted the appetite for motorcycle riding. As a result, over the past ten years the number of people holding a motorcycle licence rose by 50% (Lohrmann, 1986). This percentage precludes the number of people riding the back roads without licensure. It is not surprising, therefore, that although minor yearly fluctuations of motorcycle fatalities occurred; overall there was a dramatic increase in major crash events. More importantly, the severity of crashes involving motorcycles became favorite news items in the media. This contributed to greater emphasis on safety, in which rider safety program research played a predominant role.

Driver Training Programs

As the number of motorcyclists on the roads increased so did the number of crashes and fatalities. Because they were so often sensational they became grist for the media and statisticians. The need for safety was not overlooked by the motorcycle industry. Through the industry's

contribution of more than a million dollars' worth of motorcycles and equipment to safety councils, rider training courses could now be offered with proper resources.

On a broad scale, motorcycle rider training programs fall under the large umbrella of driver education. Two basic assumptions underlie driver education programs. They are, (1) that drivers' current knowledge, skills and attitudes are inadequate or incorrect and their improvement will reduce the likelihood of their causing a crash (Shaoul, 1975); and (2) that trained or experienced persons will perform better in most traffic situations than untrained or inexperienced people (NHTSA, 1975).

Based on these two assumptions, three hypotheses evolve. The first hypothesis assumes a causal relationship between a phenomenon (i.e., accidents) and a behavior (i.e., driving). In terms of driver education, this hypotheses reads: accidents are more likely to be experienced by drivers who demonstrate "improper" or unsafe driving behavior. Evidence has yet to be found that such "improper" behavior occurs more frequently for those involved in accidents than those not involved (Shaoul, 1975). A second hypothesis focuses on an intervention principle relating the program and the phenomenon (i.e., accidents). To illustrate: driver education will improve subsequent driver behavior, knowledge and skills leading to a reduction in accidents. A third hypothesis relates to action. It is essential for assessing whether or not the intervention program is linked to the outcome behavior that the program is intended to modify. Such a hypothesis is that trained drivers will exhibit safer driving behavior and encounter fewer accidents and violations than if they had not received training. Empirical evidence to prove these hypotheses has yet to be found.

Training Versus Education

In traffic safety literature, learning to drive is typically referred to as driver training, driver instruction or driver education. A distinction is seldom made or appreciated in the literature between these terms. However, these "not-so-subtle distinctions" have been described by Rothe (1982) as follows:

> "Training" and "instruction" imply a mechanically oriented activity; that is, teaching how the physical task of driving may be accomplished, and ignoring the areas of attitude, judgment, and the development of decision-making abilities.

> "Training" and "instruction" place emphasis by implication upon the *instructor* or the *technique*, rather than upon the *learner* or the educational process. The term "education" allows us to orient to the learner, and also allows us to recognize the special needs and responsibilities of the learner.

Driver "training" or "instruction" implies mastery of psychomotor skills or practical survival rules for operating a vehicle. Driver "education" includes the transmission of knowledge and values and the awareness of appropriate conduct. Education allows individuals to form character and to develop an awareness of their roles and experiences in the moral order of society (Rothe, 1982). Wise decision-making is an expected outcome. Based on the education perspective within the education paradigm, training is therefore only one focus. It has yet to be determined which of the following is most important and effective in accomplishing the safe driving behavior: program content, driving skills, or type of educated awareness.

Driving Skills Versus Driving Decision-Making

The lack of consistent format, content and learning techniques used in driver education and training courses is a pervading issue. Whether driver preparation courses emphasize either the "education" or "training" model of intervention depends on how the driving task is defined. For example, program developers and instructors assume the essential feature of the driving task to be predominantly perceptual-motor skills, decision-making strategies, or the interaction between the two. Naatanen and Summala (1976) concluded that:

> The demands of the driver's task are more a function of the *driver's choice* than of the characteristics of the task itself (conditions set by the vehicle, traffic environment and other road users). (emphasis added)

The interaction between the driver's level of perceptual-motor skills and his decision-making is described by Naatanen and Summala (1976). This interaction between perceptual-motor driving skills and decision-making suggests the need to educate new drivers about decision-making strategies for survival rather than only developing their perceptual-motor skills for operating a vehicle. Driver education may thus be seen as an opportunity to become aware of the choices confronting drivers, to learn safe decision-making strategies and to practise the perceptual-motor skills required to carry them out.

Weaknesses in Program Development

A major weakness in the early development and implementation of driver education and training programs has been the lack of documented effectiveness. No controlled pilot projects were carried out to ensure the relevance of a driver education course to the identified needs of the target population of drivers, to develop an objective-based curriculum, to monitor its implementation process, or to test its effectiveness in modifying driving behavior. More emphasis was placed on promotion than ongoing formative evaluation and program improvement. The latter would have helped to clarify the program components as essential for evaluating effectiveness.

In addition, there has been no standardized preparation of driving instructors or teachers. In fact, there is little consensus as to what kind of preparation or personal prerequisites define the most effective driving instructor. Basic program development requirements have been lacking such as objective-based curriculum, known effect on participant behavior, or teacher training. As a result, driver education courses have varied widely in: quality of instruction, content, time allocated to classroom instruction, simulator training, or on-the-road training. Also, still unresolved is the issue of whether to include defensive driving or emergency skills training in driver education. Program development in driver education has omitted some important program planning requirements to enable program delivery and evaluation to take place effectively (NHTSA, 1975).

Weaknesses in Program Evaluation

Methodological Problems

Early studies designed to evaluate the effectiveness of driver education in reducing the number of accidents experienced by participants were replete with methodological problems. First, many of the early studies merely demonstrated program effectiveness instead of objectively documenting the program's implementation, content and everyday learning activities as experienced by the participants (Shinar, 1978). Secondly, most studies were of a retrospective post hoc design comparing the driving records of driving course graduates with those of untrained drivers. Any differences in accident or violation rates were attributed to the experience of being trained or untrained. This kind of research did not control for several self-selection factors such as personality, gender, socioeconomic status and education (Rainey et al.,

1961; McGuire and Kersh, 1969). They have since been shown to account for differences in crash involvement between trained and untrained groups of drivers more than the experience of driver training (NHTSA, 1975). Finally, many studies did not control for the confounding effect of exposure (e.g., distance driven) which has been shown to correlate with accident frequency (McGuire and Kersh, 1969 and Jonah et al., 1982). Controlling for exposure is considered to be essential in driver education evaluation. Graduates who are accident-free drive a lesser amount per year than accident-involved informally trained drivers (McGuire and Kersh, 1969).

The NHTSA Driver Education Evaluation Program Study (1975) concluded that the only way to eliminate selection bias and to assure the comparability of groups on all relevant factors is the random preassignment of new drivers to "control and experimental" groups. However, random assignment of new drivers has often been precluded by such obstacles as: driver education being a legal requirement for licensing, insurance companies offering premium reductions for driver education graduates and the generally widespread popular belief that driver education is a "good thing," which should not be denied a control group for the purposes of research. When such a controlled experimental design is not possible, a retrospective study using groups matched by key self-selection factors and utilizing multivariate analysis techniques may be sufficient to detect program effects (Jonah et al., 1982).

Evaluation Criteria

The lack of well-defined, valid evaluation criteria stands out as another major weakness in driver education evaluation. As stated by Shaoul:

> One of the problems of evaluating driver education is that driver education is designed to achieve specific behavioral objectives and yet has never been evaluated in behavioral terms since accident records do not constitute behavior (1975, p. 12).

Accident records have continued to be used as the evaluation criteria for driver training, based on the assumption that the goal of driver education is to reduce accidents. Yet the validity of accident records as a measure of performance is questionable. When controlling for differences between trained and untrained drivers both before and after training, no causal relationship between driver training and accident frequency has been found. Shaoul (1975) also questions the conceptual validity of accidents as a measure of driving performance by observing

that the driver has many more "near misses" than accidents. Without a known ratio of "near misses" to accidents, the number of accidents per person cannot be a good indicator of a person's safe driving performance. Driver records may provide an inaccurate picture of driver performance due to incomplete recordings and recording errors along with jurisdictional differences in enforcement, adjudication and recording procedures (NHTSA, 1975; Zylman, 1972). These variations in driver records can especially cause problems with "before and after" studies and with comparisons of drivers between geographical locations (NHTSA, 1975).

Instead of accident frequency, some evaluations have used the short-term or intermediate criteria of knowledge levels, skill performances and attitude changes. However, it is questionable whether these measures are related to program effectiveness in achieving the ultimate goal of crash reduction. Since the validity of drivers' records as measures of driver behavior has been criticized (Zylman, 1972), it is doubtful whether driver behavior as measured by knowledge levels, skills and attitudes has any relation to subsequent accident and violation records. Until behavioral performance measures are developed which can be used in evaluation as valid predictors of subsequent crashes (NHTSA, 1975), it cannot be assumed that the use of intermediate performance criteria properly evaluate the effectiveness of driver education programs in preventing accidents.

Given the doubtful validity of accident and violation records as measures of driving performance, it may be even more critical for the future direction of driver education evaluation if accident and violation frequency remain its only focus. Instead of only examining accident frequency as a singular outcome of driver education, evaluation research studies could observe other program effects which may be more directly relevant to defining safe driving behavior. As Shaoul recommended:

> As far as possible, evaluation should be used to understand how the course produces its effects and . . . more than simply provide information about a particular course . . . help us to understand educational learning (1975).

An understanding of how driver education promotes the learning of safe driving behavior by novice drivers has not yet been achieved. The literature does not include driver training evaluation studies which examine the actual process of how training programs are delivered (in terms of instructional techniques), how program activities are experienced by participants, or how effective the learning process is in meeting its objectives.

In summary, the weaknesses outlined in the development of driver education programs accompanied by the evaluation shortcomings result in uncertainty as to what is good driver education, whether good driver education is effective in teaching safe driving behavior and what is the best educational process for learning safe driving skills and attitudes.

Driver Education Participants: Self-Selection Principle

According to Rainey, Conger and Walsmith (1961), a crucial question concerning driver education is: Are students who elect to take driver education significantly different from students who do not elect to take such courses?

Through arrangement with driver education instructors, Rainey, Conger and Walsmith matched male subjects who elected driver education with a non- education control group. Both groups were then compared with regard to the results of personality tests administered before either group had the opportunity to elect or decline driver education.

Statistical analysis of the pre-driver education personality data revealed that the driver education and non-driver education groups differed significantly as stated by Rainey et al. (1961, p. 23):

1. **General activity.** The driver education group appeared less active; more deliberate and restrained; less prone to rapid and hurried action ($p = 0.001$).

2. **Ascendance.** The driver education group appeared significantly less concerned with dominating or persuading others; less concerned with being conspicuous; and more likely to be serious and subdued ($p = 0.005$).

3. **Sociability.** The driver education group displayed significantly more shyness and avoidance of social contacts, was more inner-directed, and in general was more reserved and less spontaneous in social participation ($p = 0.005$).

Rainey et al.'s conclusion, supported by Asher and Dodson (1970), Naatanen and Summala (1976) and Waller (1970), was that those students who elect to take driver education are, in essence, a selected group, and that the nature and significance of these selective characteristics must be considered in weighing the total contribution driver education makes to traffic safety.

Harrington (1972), in his four-year longitudinal study, showed that those taking behind-the-wheel training have somewhat better accident records during their first year of driving than those not taking such training but after the first year, no major differences were found. However, Asher and Dodson (1970) did not find any favorable effects of driver training on accident experience during the first year following training.

Harrington (1972) and Naatanen and Summala (1976) were quick to point out that no definite conclusion could be reached as to whether or not driver training reduced accidents. There were major differences between the groups on a number of biographical factors and socially desirable characteristics, indicating self-selection biases.

In light of what has been presented, it would be productive to relate the process of learning to drive safely in motorcycle rider education.

Motorcycle Rider Education Programs

Motorcycle rider education courses are based on the premise that education serves as a countermeasure to accidents and fatalities (Motorcycle Safety Foundation, 1982). The emphasis for promoting motorcycle rider education programs reflects Nicholi's (1970) reference that, as motorcycle sales have increased, so too have motorcycle injuries and deaths. To address this situation, the American Medical Association, the National Highway Traffic Administration Board and the Motorcycle Safety Foundation have become involved in projects to educate motorcyclists on the risks of alcohol and drug use when operating a motorcycle. These programs are in addition to the traditional motorcycle rider education programs intended to address the motorcycle accident problem. A review of motorcycle rider education courses offered by the Motorcycle Safety Foundation, Canada Safety Council and British Columbia Safety Council shows the following learner objectives:

1. Locates and operates the controls and devices.
2. Performs pre-street procedures.
3. Performs basic vehicle control procedures.
4. Demonstrates fundamental motorcycle riding skills.

5. Performs routine riding tasks.
6. Operates safely in traffic.
7. Prevents and protects from highway loss.

The learner objectives reflect the motorcycle accident problem described in the following pages.

Magnitude of the Motorcycle Accident Problem

Over the years there has been a dramatic increase in the number of motorcycles. For example, from 1960 to 1975, the number of on-road motorcycles in the United States increased from 550,000 to 5,000,000 (NHTSA, 1975). In British Columbia, there was an 800% increase from 9,012 to 81,690 licensed motorcycles between 1964 and 1984 (Motor Vehicle Department, 1984-85 Annual Report).

The number of motorcyclist fatalities in Canada has increased gradually over the past decade, with 447 fatally injured motorcyclists recorded in 1983. This represents a 15% increase since 1979 (Mayhew, 1984). As motorcyclist fatalities have increased the number of overall road user fatalities have decreased. Motorcyclist deaths have claimed an increasing proportion of all Canadian road user fatalities from 4% in 1970 to 11% in 1983 (Mayhew, 1984).

According to U.S. sources, personal injury or death occur in 80% of reported motorcycle crashes (Hurt et al., 1981). One-third of these injury or fatal crashes occurred in the first six months of driving experience (NHTSA, 1975). The death rate for U.S. motorcyclists is approximately nine times higher per 100 million miles of travel than for automobile occupants (Buchanan & Tarrants, 1982). Such data indicate that motorcycle accidents are an important and increasing problem. The risk of death or injury in motorcycle accidents throughout all of Canada is about 40% greater for death and 120% greater for injury than that encountered in all motor vehicle accidents (TIRF, 1967). A more recent assessment in British Columbia (Cooper, 1985) suggests that motorcycle riders may be 8 to 9 times more likely to be in a casualty-producing crash than are passenger car drivers based on their relative accident involvements per kilometre driven.

Characteristics of Motorcycle Accidents

Five major characteristics of motorcycle accidents should be discussed.

Multi-vehicle Crashes

According to Hurt et al. (1981) collisions with automobiles are the most frequent kind (74%) of motorcycle accidents. In British Columbia, motorcycle collisions with other motor vehicles account for 71% of motorcycle incidents (Motor Vehicle Department, 1985).

Other Vehicle Driver at Fault

Hurt et al. (1981) concluded that in 65% of multi-vehicle accidents, the driver of the other vehicle was at fault by violating the motorcyclist's right-of-way. Failure to see or recognize motorcyclists in traffic was the most frequent cause of accidents. At intersections the frequent cause was the other vehicle failing to yield the right-of-way while making a left turn in front of the oncoming motorcycle (Hurt at al., 1981).

Single-Vehicle Crashes

Hurt et al. (1981) found that one-fourth of motorcycle accidents involved the motorcycle colliding with the roadway or some fixed object with rider error responsible 64% of the time. This usually involved a slide-out due to overbraking or running wide on a curve due to excess speed.

Major Contributing Factors

British Columbia motorcycle accident statistics for 1985 show that the majority of motorcycle accidents occurred during daylight (69%), clear weather conditions (71%), and on dry road surfaces (86%). Major contributing factors for motorcycle incidents in 1985 were: driving without due care, driving at unsafe speed, alcohol involvement, driver inexperience, and failure to yield right-of-way (Motor Vehicle Department, 1985).

Engine Size

Simpson and Mayhew (1984) deduced that there is no unambiguous evidence to support the myth that larger motorcycles—either alone or in combination with inexperience—increase the risk of an accident. Hurt et al. (1981) found that large displacement motorcycles were underrepresented in accidents but they were associated with higher injury severity when involved in accidents.

Commentary

Mayhew (1984) summarized that human factors are the major causes of motorcycle accidents. Multi-vehicle crashes are most frequently caused by drivers of other vehicles, while single-vehicle crashes are most frequently caused by motorcycle operators. A large majority (80%) of motorcycle accidents involve injury or death (NHTSA, 1975).

Characteristics of Accident-Involved Motorcycle Drivers

The following findings refer only to motorcycle rider and accident data.

Age

Hurt et al. (1981) found that "motorcycle riders between the ages of 16 and 24 are significantly overrepresented in accidents, (while those) between the ages of 30 and 50 years are significantly underrepresented." Mortimer (1984) also found that motorcyclists over the age of thirty have substantially lower accident rates than younger riders. In the United States up to two-thirds of motorcyclists in accidents are under the age of 20 years (NSC, *Motorcycle Facts*, 1972). Similarly, a study of military personnel in British Columbia showed that motorcycle riders between 18 and 24 years old represented 63.5% of accident-involved riders (Beausoleil, 1984).

Gender

The majority (96%) of accident-involved motorcycle riders are male and usually young, however Hurt et al. (1981) found female motorcycle riders to be significantly overrepresented in their accident data.

Education and Grades

Less educated riders have been found to have a higher incidence of both recorded accidents and accidents reported in interviews (Jonah et al., 1982). Waller et al. (1969) found students with poor grades tended to have poor driving records.

Marital Status

Jonah et al. (1982) found that the incidence of self-reported accidents was greatest for single (never married) motorcycle riders, and that the incidence of accidents on motorcycle driver records was greatest for divorced or separated motorcyclists.

Motorcycling Experience

In the sample studied by Hurt et al. (1981), more than 50% of accident-involved motorcyclists had less than five months' experience riding the accident vehicle, although their total street riding experience was almost three years. Dwyer and McCord (1980) reported that a significant number of motorcycle accidents occurred within the first 6 months of motorcycle riding, and up to 50% of motorcycle accidents occurred within the first year of riding. Mortimer (1984) reported that those motorcyclists "who have been licensed for four years or more had lower accident rates than those licensed for a shorter time." Johnson (1970) publicized the findings of Harano and Peck's (1968) study of California motorcycle drivers and accident characteristics. They indicated that young motorcyclists with little riding experience had a high rate of motorcycle accidents.

Driver Training

Most motorcycle riders involved in accidents have no formal training, 92% being self-taught or taught by family or friends (Hurt et al. 1981). Indeed, the authors suggested motorcycle rider training experience reduced accident involvement and was related to reduced injuries. Motorcycle training program evaluation studies by Jonah et al. (1982) and Mortimer (1984), however, showed the opposite conclusion when they controlled for confounding factors differentiating the trained and untrained driver groups.

Licence Status

Approximately 50% of accident-involved riders did not have a motorcycle driver's licence or a valid operator's licence in the study by Hurt et al. (1981).

Repeated Accidents

Hurt et al. (1981) found that motorcycle riders with previous traffic citations and accidents were overrepresented in the accident data.

Characteristics of Motorcyclists Versus Non-Motorcyclists

Researchers like Johnson (1970) and Waller et al. (1969) compared personality characteristics of motorcyclists with non-motorcyclists. They found no significant difference between the two groups. The only major difference found by Johnson was in the attitude toward the use of safety

helmets. Twice as many non-motorcyclists as motorcyclists supported their use. Waller et al. on the other hand concluded that the only differences between the motorcyclist and non-motorcyclist groups were demographic. For example, motorcycle riding students were less likely to be in graduate or professional school, less likely to be married and more likely to be from out of state than automobile-driving students. Both Johnson and Waller et al. focussed on young male drivers under 30 years of age, or male undergraduate and graduate students attending a large university who drove motorcycles or cars registered on campus.

Evaluations of Motorcycle Rider Education Programs

Evaluation Purposes

Most motorcycle rider education program evaluations were designed to judge the effectiveness of the program's impact on trained motorcyclists' driving behavior. The criteria for measurement were motorcycle accidents and violations. This evaluation approach stressed outcome behavior without focussing on the planning, implementation and daily routines of motorcycle training programs. In evaluation literature, measuring outcomes is consistent with summative evaluation whereas assessing process relates to formative evaluation. Thackray and Prescott's (1980) study of the Motorcycle Safety Foundation's motorcycle rider course in Denver, Colorado is one of the few formative evaluation research reports available which field tested a program to assess instructional effectiveness, user acceptance and administrative feasibility.

Data Collection and Sources

The data collection methods used in evaluations of motorcycle rider education programs have typically been telephone or mail-in surveys (Jonah et al., 1982; Satten, 1980; and Osga, 1980). Mortimer (1984) and Satten (1980) noted that driver histories have often been determined by using only self-reported accidents and violations. Jonah et al. (1982) and Collins (1979) used self-reported driver histories in conjunction with reviews of official driver records or accident statistics. Since the validity of using official accident and violation records as measures of driver behavior has been questioned, use of self-report methods in combination with official records is deemed more accurate than reliance on official records alone (McGuire and Kersh, 1969; Zylman, 1972; and Shaoul, 1975).

Evaluation Criteria

The effectiveness of various motorcycle rider education programs has been measured by criteria which have included: accident and violation history (Collins, 1979; Osga, 1980; Satten, 1980; Jonah, Dawson and Bragg, 1982; Mortimer, 1984) knowledge and skill (Osga and Ellingstead, 1978), and awareness of safety strategies such as the use of protective clothing (Satten, 1980). These criteria restrict comparison between studies that report effectiveness in terms of motorcycle rider knowledge and learned skills, and those reporting effectiveness in terms of frequency of accidents and violations experienced since training. Effectiveness in achieving intermediate criteria such as skills and knowledge is conceptually dissimilar to effectiveness in reducing accidents.

Post Hoc Designs

Most studies attempting to evaluate the effectiveness of motorcycle driver education have used a retrospective, post hoc research design. Graduates of motorcycle rider courses have been compared to non-participating untrained drivers after the former's completion of a driver training course. Retrospective analysis is often the preferred research design when it is impossible to conduct a longitudinal study using random group assignments before commencement of a driver education course. The major weaknesses of a retrospective design are a lack of control for self-selection bias and for pre-training differences between groups. To sidestep these shortcomings, Jonah et al. (1982) used multivariate analyses in their retrospective examination of the riding histories of Canada Safety Council motorcycle training program graduates and informally-trained riders. Through this procedure they controlled for group differences prior to training (e.g., in attitude toward safety) and for those developing after training (e.g., exposure to risk). Jonah et al. claimed that although the effectiveness of any training program may be assessed unequivocally through random assignment to training conditions, a retrospective study allows the researcher to assess the likelihood of proving program effectiveness under such experimental conditions. It is assumed that selection bias operates in a direction favorable to the effects of a training program. If there are no observable program effects on the outcome criteria in a retrospective study, it is unlikely that the use of random assignment of drivers to treatment conditions would have indicated program effectiveness (Jonah et al., 1982). Hence a well designed retrospective post hoc research design can produce relevant data.

Control Groups

The attention paid to control groups is noteworthy. Numerous studies did not use control groups. They compared groups only by accident statistics to the exclusion of other relevant variables. For example, Collins (1979) reported that motorcycle riders who completed a motorcycle safety education course had significantly fewer accidents, injuries and violations after attending the course. However Collins (1979) did not use a control group for comparison. Instead he used the national and California rates for accidents, and the number of injuries and fatalities. The non-use of a control group and singular use of accident and fatality statistics as comparison variables, excluded comparisons of the motorcycle group to the California population of motorcyclists according to variables such as age, education, experience, miles driven, socioeconomic status, and attitudes toward safety. These may have greater effect on accident frequency than training.

Sample Size

Several evaluation studies reporting a favorable outcome of motorcycle training programs had a limited sample size. For example, Collins' (1979) and Satten's (1980) findings were based on only 100 trained motorcyclists. Yet Mortimer's (1984) study, which reported no reduction in accident and violation rates as a result of training, was based on 684 questionnaire responses: 360 from motorcycle rider course graduates and 324 from the untrained control group. Jonah et al. (1982) interviewed 811 trained motorcyclists and 1,080 untrained motorcyclists.

Risk and Exposure

Evaluations of motorcycle training programs have not always controlled exposure to risk for trained and untrained motorcyclists. Collins (1979) did not account for miles driven per year, length of riding experience or patterns of motorcycle use when he compared the trained motorcyclist group with the U.S. national average. Although Satten (1980) described differences in exposure to risk in terms of riding distance per week between trained and untrained motorcyclist groups, he did not control for these differences in exposure when he compared their accident and violation rates. By contrast, Mortimer (1984) discussed accident rates in terms of accidents per million miles ridden. He controlled for age and number of years licensed to determine accident rates for the trained and untrained groups. Jonah et al. (1982) also included "vehicle distance travelled in last 4 years" as one of the covarying factors in a discriminant analysis involving accident and violation criteria.

Description of Program Process

Some evaluations of motorcycle rider training programs have included a brief description of the structure and format of the course from the instructors' perspective (Satten, 1980; and Jonah et al., 1982). However, none of the existing evaluations of motorcycle training programs have included an in-depth description of how the program is experienced as a learning process by the course participants. A qualitative examination of a training process as experienced by novice motorcycle riders helps determine other specific aspects of program effectiveness (e.g., pedagogical style, quality of interaction, mastery of knowledge and skills, and self-image development of the novice motorcycle rider). These aspects of the motorcycle rider's learning process may be more significant in determining safe driving behavior than is the narrow focus on accident and violation rates.

Summary of Major Evaluation Findings

Accident Rates

A review of the evaluation research literature to date shows that no conclusions may be drawn concerning the effectiveness of motorcycle rider training in reducing motorcycle accidents. No causal relationship or direct effect between motorcycle riding training and accident or violation frequency has been confirmed. In fact, at least two evaluation studies found that motorcycle course graduates had a significantly higher accident rate than untrained motorcyclists when controlling for distance travelled by motorcycle (Raymond and Tatum, 1977, and Osga, 1980). Both Jonah et al.'s (1982) evaluation of the Canada Safety Council Motorcycle training program and Mortimer's (1984) evaluation of the Motorcycle Safety Foundation course in Illinois found that course graduates did not have a lower accident rate than untrained riders when controlling for age, years licensed, gender, distance travelled, education and riding after drinking. Mortimer (1984) also found that the trained group did not have significantly lower cost of damage to the motorcycles or significantly lower estimated medical costs for injuries per million miles ridden.

Violation Rates

While Mortimer (1984) found that there were no differences in the violation rates between the trained motorcyclists, both Satten (1980) and Jonah et al. (1982) reported there were fewer violations among those who had taken the course. Jonah et al. (1982) controlled for the confounding factors of age, gender, distance travelled, education and riding after drinking. McGuire and Kersh (1969) emphasized the independent nature of accidents and violations; groups should not be compared in terms of violation frequency when they are matched only on accident-correlated variables. Comparing groups in terms of violation frequency can be correctly done only when the groups are matched on those variables related to violations. This is what Jonah et al. (1982) appear to have done. The apparent positive effect of the Motorcycle Training Program on violation behavior could be explained in terms of the prior safe attitudes of these riders who chose formal training. The effects of selection bias could only be eliminated by future research using random assignment to training and to no-training conditions.

Official Driver Records versus Self-Reported Accidents

An indication of the value of collecting accident data from both respondents' self-reported incidents and from official driver records was Jonah et al.'s (1982) finding that motorcyclists' driving records considerably underestimated the frequency of accident involvement among motorcyclists.

Use of Protective Clothing

Both Satten (1980) and Mortimer (1984) found that those groups who had taken a motorcycle rider training course were more likely to use safety apparel such as helmets, bright colored clothing, gloves, eye protection, long pants and long-sleeved shirts or jackets, or heavy shoes which may reduce the severity of injuries. The average medical cost of injuries to riders per accident was substantially less among Mortimer's (1984) trained motorcyclist group than the untrained group.

Rider Knowledge and Skills

Osga and Ellingstead (1978) found that the Motorcycle Rider Course increased the knowledge and skill of motorcycle riders. While course graduates outperformed a group of experienced riders and a group of motorcycle licence applicants in a knowledge test, the experienced riders outperformed the course graduates on the skill test.

Non-Riding Course Graduates

Mortimer (1984) discovered that 44 percent of those who were successful rider training course graduates had not ridden a motorcycle in the past year. He suggested that possibly the experience of learning to ride had discouraged graduates from using this mode of transportation. The training course thus had the indirect effect of keeping novice motorcyclists off the road where some of them might become involved in accidents. This is the opposite effect to that of early licensure sometimes cited as a disbenefit of driver education generally.

Conclusion

The review of major findings from motorcycle education evaluations has produced no definite conclusions about: (1) what is good motorcycle rider education, (2) whether good motorcycle rider education is effective in teaching safe driving behavior, or (3) what is the best educational process of learning safe motorcycle rider skills and attitudes. This situation results from the research having its primary focus on the measurement of outcome criteria such as accidents and violations, rather than also attending to the process of how the course is presented and how the learning is experienced by the participant. There needs to be clear documentation and explanation of how motorcycle education is delivered in practice before program planners and evaluators can define what course elements may produce specific outcome behavior.

CHAPTER 3
MOTORCYCLISTS IN EVERYDAY LIFE: SEEN-BUT-UNNOTICED FEATURES

J.P. Rothe

Introduction

It is assumed that rigorous research on a phenomenon should not only produce objective results but also it should reflect the everyday identity of the phenomenon. In short, empirical rationality needs to be reconciled with everyday social patterns.

The phenomenon under study is motorcycling. To envision the meaning of motorcycling on the streets, we chose to look at motorcyclists' everyday realities. A description of their emotions, fears, thrills, views of self, influences, relationships and patterns of reasoning provides a starting point for further study. It is the emic lifestyle and situatedness of motorcycle riders.

Motorcyclists are individuals who, like other people, share behaviors, viewpoints and reasons. As social beings they engage in activities that correspond to everyday rationality. Everyday rationality is well-defined in social theory. So, to portray an emic painting of motorcycling as street behavior, we searched for riders' sense-making patterns and combined them with relevant components of social theory. The finished product provided us with a slice of motorcycling reality which, at the street level, structures and supports much of the statistical explanations.

Data

Semi-structured intensive interviews held with 100 motorcyclists and 60 randomly-selected motorists provided the bulk of the detailed information. At various motorcycle shops around Vancouver, two researchers sought to discover the motorcyclists' experiences of motorcycling. Rather than attempting to determine the frequency of preconceived kinds of things, the interviews sought to find out what kinds of things exist in the first place.

A second seldom used variant of standard research was the activation of a province-wide, hour-long open-line radio show. Questions were asked over the radio and call-in responses came from motorcyclists. In all, ten riders participated, although the switchboard was filled. Further, newspaper articles were analyzed as were a special television show on motorcyclists and a radio program on helmet use.

Analytic patterns were borrowed from the writings of social psychologists (e.g., Glaser), sociologists (e.g., Goffman), phenomenologists (e.g., Schutz) and criminologists (e.g., Silverstein). Categories which reflect social theory were selected to display the everyday seen-but-unnoticed features of motorcycling. They are based on Gilbert and Mulkay's premise that:

> . . . although participant's substantive accounts of action and belief are highly diverse, they are constructed out of recurrent interpretative forms and repertoires which can be identified, described and documented by the analyst (1984, p. 189).

The Etiological Question

"How does an individual become a motorcycle rider?" is a worthy question when one wishes to distinguish motorcycle riding experiences in different ways. Some of the most common distinctions are: self and other motorcyclists, self and the law, self and motorists, and private self. Reasons for entry into the motorcycle world contribute to a corpus of information which help disclose the essentiality of motorcycling, the consideration of individuals' possibilities with machines and others.

It should be noted that motorcycling captures the interest of a diverse group of people all the way from accountants to heavy lifestyle bikers. Although the members differ, nevertheless, their initiation follows one of four categories.

After a lengthy search for patterns of motorcycling entry points, the following grouped reasons at once suggested themselves, as the basis for an etiology of motorcycle riding:

1. **Initial entrance into motorcycling is the result of a person's psychological drive towards risk taking. The emphasis is on risking life and limb for a thrill.**

To do something challenging was one of the entry points. As one motorcyclist indicated:

> I wanted to do something challenging. To lean over this way and that way getting my ya ya's out . . . as long as I'm alive I'm having a good time.

So he started motorcycling! Dragging his knees, leaning into curves, testing the bike and himself. Riders who were initiated into motorcycling for reasons of life-risking thrills reflected on the high order value of "being close to the edge." They began motorcycle riding to see what they were made of. Their life at the time they chose to ride a motorcycle did not offer them the kind of thrill-chances new riders needed. The thrill of pushing oneself to maximum physical limits was defined according to the mastery of powerful technology. The bike is the thing. To control the ferocity of the motorcycle in adventurist fashion epitomizes the risk-taking drive towards motorcycling.

2. **Initial entrance into motorcycling is the result of a practical, conscious decision to partake in a recreational event which promises pleasure while maintaining a level of safety.**

The motorcyclists who began to ride for recreation or pleasure often did so by experimenting. They wanted to do something different and exciting. They therefore tried motorcycling. The experiments were successful. Motorcycle riding proved to be fun and exhilarating. It allowed individuals to go out and enthusiastically hit the "open road." Based on individuals' self-evaluations that they were "stuck" in their routine boring jobs or mundane family lives, they realized that there was little chance of self-exploration. They wanted to try something different, "to just go out there and have a good time."

Some decisions to ride motorcycles reflected a normative order of progression. For example, a group of motorcycle riders progressed from small bikes to large bikes or from passenger to operator. Consider the following:

> I'm an avid bicycle rider too. So it was just a gradual progression to a motorcycle. Start hacking around with little dirt bikes then move up from there.

> Friends of mine had one. Someone used to take me for bike rides on the back. I thought it was a thrill and wanted to get my own.

There is an inevitability that the experience of motorcycling functions within a progression of stages. The desire for pleasure increases to a new stage where a new role or a different motorcycle is chosen.

3. **Initial entrance into motorcycling is the result of a person's poor social adjustment. He has a wanderlust and a view of social norms which is marginal according to societal standards. It is an escape from the requirements of the society.**

Reasons for beginning to ride motorcycles do not need to focus on the machine-self relationship leading to existential meaning of thrill, or play. They can reflect social factors. Some riders, now fully committed to motorcycling, began riding to share a way of life considered to be outside of mainstream society. They joined rider groups as for example, Hells Angels or Satan's Choice, to partake in a lifestyle which absolves them of many societal standards and norms. These groups abide by a set of norms and rituals which are distinguishable from society's concept of customary conduct. The motorcycle is a symbolic piece of the motorcyclist culture.

4. Initial entrance into motorcycling is the result of economic advantages whereby the purchase and operation of a motorcycle is substantially cheaper than other vehicles.

The fourth predominant set of reasons for people to begin motorcycle riding is for practicality or necessity. In short, the motorcycle was "the only transportation they could afford." By being mechanically minded enough to repair motorcycle engines and by having the chance to operate a transportation machine that runs on the fraction of the cost of an automobile motivated a segment of riders to start motorcycle riding.

The etiology of motorcycle riding has a universalistic sense to it. In the majority of interviews with motorcyclists, respondents presented descriptions on riding which touched on one or more of the four categories. Similarly, motorists-at-large presented points of views on motorcycle riding which easily meshed with those given by motorcyclists. With little variation, peoples' beliefs were synonymous with motorcyclists' reasons for riding. Most often motorists felt that motorcyclists chose to ride in order to search for pleasure, desire a macho image as presented by motorcycle gangs, drive an economic advantageous mode of transportation, and become involved in a life-threatening thrill.

The categories of risk thrill, recreation, lifestyle and economic practicality are major bases upon which the practices of motorcycling are built. They are the original procedural definitions of activity which predominate the motorcycling initiation. They delineate the personal components of decisions made for motorcycling.

Self and Others

"No man is an island," Aristotle remarked in a statement that has been quoted again and again. With the exception of hermits, shepherds, lighthouse keepers, prisoners in solitary confinement, and a few others, no human being lives alone for any extended period of time (Bierstedt, 1974). The majority of people do not live alone, they consequently live alongside people—all kinds of people. The living together forms a person's self. As Mead wrote:

> It is the social process of influencing others in a social act and then taking the attitude of the others aroused by the stimulus, and then reacting in turn to this response, which constitutes a self (1934, p. 171).

The taking or feeling of the attitude of the other persons towards oneself constitutes self-consciousness. Cooley (1926) stressed the role of other people in the genesis and growth of a personality. The "self" develops within a context of social relationships: 'Self and other do not exist as mutually exclusive facts" (Timasheff, 1955). The self is a "looking glass" self, masked by three principal elements: the imagination of our appearance to the other person; the imagination of his judgment of that appearance; and some sort of self feeling such as pride or self-esteem.

A profound relationship between the self and others leading to certain actions is defined in the selective identification theory. According to this theory, the image of behavior as role-playing presents a structure for people acting on the basis of their conceptions as to how others see them. The choice of another, from whose perspective we view our own behavior, is the process of identification (Glaser, 1965). It may be with close others or with distant generalized others of a reference group. For example, a music student may identify himself with an opera singer whom he has never met. Backyard hockey players envision themselves as National Hockey League all-stars and sports-car drivers may see themselves as Indianapolis 500 racers.

Role imagery provides us with a useful lense for explaining the phenomena of motorcycle riding. New motorcycle riders, for example, may identify with other motorcyclists through positive reference to rider roles portrayed in mass media, through observation of other riders, or through idealized versions of generalized other motorcyclists. During any period, prior identifications and present circumstances dictate the

selection of persons with whom motorcyclists identify themselves. While riding down the highway, the "easy rider" look-alike-image may come to mind. It is a pleasing image and therefore may influence riding behavior. Consider the following normalizations of this notion:

> Everybody that is on a bike feels that they're the modern-day cowboy. Especially when you're on a Harley, they all feel a little bit of an independent, carefree rider. That's the way they see me. I don't want to be perceived as an outlaw because I don't think I'm that kind of a person. I want to get on a bike, sometimes I don't care, sometimes I do. The Harley image is especially that way.

> Everyone who riders a Harley tends to group themselves in one bunch. Same way as the guys who ride the Japanese bikes, they want to be perceived another way; the people who ride the touring bikes, they want to be perceived another way. Every different type of biker wants to be perceived a different way. I like all bikers; they all have the same idea why they ride.

> People don't like bikers. They don't like 'em. They don't have a good image, like they go too fast. So people should like—let them get ahead instead of behind them. Then they can forget about them.

The motorcyclists' self is an extension of others perceptions. Whether it be riders acting according to peoples' views, or reacting to outside views. On a Harley, the riders are the "lone riders," "Lone Rangers," "outlaws," who "dress a certain way" to fit that outlaw look. They are a different breed altogether, the "coolest riders." They are confident, portraying images of the lone biker. Their media message reinforces how they perceive themselves or want to be perceived:

> The lone biker—you know. Kodak has done a nice one. A guy riding a Harley out in the middle of nowhere down a desert road, this kind of thing. Like I said, everyone wants to be the modern day cowboy on a bike. That's what they feel like. The picture of a cowboy out in the desert on his horse. That's what people perceive themselves as, really.

Sexual identifications so often emerge when discussion relates to self and others. In short, a recognizable psychological principle of self-definition for a man is "how the lady sees him seeing her in a situation."

Not surprisingly, therefore, an image of self on a motorcycle is to portray "availability to pick up girls." Feelings of independence and freedom are considered to be preferred qualities for making contact with members of the opposite gender. As one motorcyclist responded to the question of motorcycle and lifestyle:

> It's easier to pick up chicks. You ride a Harley and they say, wow—oh man, you have to fight 'em off. Riding a Harley is like an aphrodesiac.

Images in the media visually validate the sexuality thesis. More than once, motorcyclists answered that advertising showing a "sleek bike" and a "pretty lady" is appealing.

The who-am-I-in-relation-to-the-other rule often gets acted out in "getting kicks." For physical and mental thrill, some motorcyclists "speed," "do wheelies," "ride down sidewalks," and overall they "show off." They recognize such actions form bad images for motorcyclists, but they prefer it that way. The "who am I" becomes "what I am like, you don't like." Consider the following colorful descriptions:

> I don't think I help the motorcycling image. I do some stupid things but not excessively. I'm pretty normal, but a lot of times I'm a ying yang who is a jerk motorcyclist . . . I'm getting my ya ya's out. As long as I'm alive, I'm having a good time.

> Speeding and cutting in and out gives bikers a bad image. People look at you, heh, there goes another crazy biker. I like to speed too but I pick my spots. If its called for, I'll do it. I don't care what anybody thinks. I usually do it early in the morning.

It is not surprising that motorists describe motorcyclists who weave in and out of traffic as: "dangerous," "reckless," "individualistic," or "tough." Motorists reflect in part what some motorcyclists do or the image motorcyclists have of each other. It was not uncommon to establish the following motorists' first impressions of motorcyclists:

1. Hells Angels; Satan's Angels
2. They disobey regulations by passing you without warning.
3. There are lots of them on the road who don't respect regulations.
4. Kind of crazy.
5. A little bit daring.

So often motorists have negative stereotype images of motorcyclists developed from observation and experience. These images are not lost on some motorcyclists. They are aware of motorcyclists' poor images and actions which have led to peoples' critical constructs. They commit themselves to be responsible riders for themselves and for other riders. They have an idea of how they want motorcyclists to be. As one riding enthusiast stated:

> My image varies—whether I'm being a goose or acting responsibly. Sometimes, I'm totally ashamed of myself—take advantage of the youth left in me, take advantage of sporting aspect—speed. Sometimes I feel good, sometimes I feel proud and sometimes I feel if I'm not riding well—goofy. So I like to ride with a little bit of style and class. Style and class are important to enjoy myself the way I want to. It looks best for motorcycling.

It was not unusual to discover that a group of motorcyclists perceive other riders according to the sums of their acts which are negatively valued by people. Nearly all motorcyclists have biographical accounts of riders "racing the roads," "driving like jerks," "cutting people off," or "being crazy." It was commonly agreed that motorists perceive motorcyclists in a derogatory way. Yet some riders do not place themselves in this image. They like to think of themselves as "just riders," who are "normal road users." They do not have the attitude problem that so many other riders were described as having. They choose to preserve their own integrity while influencing the motorcycling world in its composite.

Motorcyclists as Social Organization

As researchers we recognize Durkheim's (1933) intriguing problem of how people can operate as individuals in some contexts and as members of a group in others. Motorcyclists come from a variety of social backgrounds with unique interests and desires. Yet they share a common tradition, motorcycle riding. Motorcyclists form a heterogeneous conglomerate of different social histories that have developed from different sociohistorical factors and that are associated with diverse systems of social reality (Berger and Luckman, 1966).

The heterogeneous conglomerate of motorcyclists may be defined as a form of social organization. According to Krech et al (1962), a social organization is an integrated system of interrelated groups or sub-

organizations. As a loose social organization, motorcyclists understand each other, at least to the degree to which they are able to deal successfully with one another. They reason and act on the self-understood assumption that motorcyclists, although coming from different walks of life, nevertheless are like each other, endowed with recognizable desires and emotions related to motorcycle riding (Schutz, 1975).

On a continuum, the motorcyclist organization is composed of unorganized groups at one end and highly organized ones at the other. The most highly organized is, for example, the "Hells Angels" who sustain a total life commitment to the group's entity, structure, purpose and leadership. Less highly organized groups, such as the "touring clubs," are more dependent upon particular people and planned events. The least organized groups represent people whose only identification is a certain type or make of motorcycle which symbolizes their interests. For convenience, one can come up with five motorcycle-defined groups. That is, the machine is the symbol which signifies groups of riders. The most common are the Harleys or hogs, sport bikes, dirt bikes and "Gold Wings." Harley riders tend to ride slower with distinct body posture. One interviewee mentioned:

> Riders on hogs think they're riding the best. You wave to others on a Harley. If you drive anything else, they look the other way.

> I relate to a certain social circle all my friends are involved with. I guess you can call us bikers. All my friends ride Harleys, right!

The Harley Davidson stands out as a manufacturing trade name and group attachment. Others tend to be grouped by nationality (e.g., Japanese bikers) or purpose specificity (e.g., dirt bikes). Also, Harley bikers are recognized as different; the American machine which is not imported. It is part of the American dream. Racist overtones are sometimes given to illustrate the superiority of a Harley. To be a rebel and to be perceived as a rebel necessitates the ownership of a Harley Davidson.

Within the broad motorcyclist organization, is a large percentage of individuals who are unorganized. That is, their only qualification for organizational membership is their possession of a bike. Their principal function or activity is to competently ride a motorcycle. This aggregate has open membership and no authority. The members do not know each other, yet they greet each other on the open road. They do, however, share a similar symbolic universe, or overall view of the values of motorcycling.

The non-specific group members, although being individualistic, do hold a personal fascination, often implicitly, for certain groups' sub-cultural universes. For example, so often casual riders said that they believe Hells Angels, motor-cross racers, sport bikers or Harley drivers are their ideal-type riders. The binding thread of the sub-groups is a popular cultural universe defined by a locus of values such as freedom individualistic prowess, and pleasure.

Within the social organization of motorcyclists is a tendency of groups and/or individuals to look differently. On a broad scale, variations in clothing are both possible and desirable. For example:

> High-ranking Army officers in World War II frequently adopted distinctive outward signs of their individuality. One general, for example, wore a battle jacket rather than the traditional blouse; another was identified with sunglasses, a corncob pipe, and a sweat-stained cap; a third took an especial delight in his highly polished helmet and pearl-handled revolvers; another usually attached a hand grenade to his blouse; and still another was seldom photographed without his beret. Similarly, groups within the Army adopt distinctive shoulder patches and other decorations to set themselves off from others; monks and nuns of the various Catholic orders wear distinctive habits; and nurses who receive their training at different hospitals symbolize their respective affiliations by special caps (Bierstedt, 1974, p. 243).

Similarily, different recognizable groups of motorcyclists wear clothes which reflect their own identities. It would be highly unlikely to see a Harley driver wear a streamlined, high-technology helmet or a sleek, matching leather jacket and pants. At the same time, a sport biker driving an Interceptor or Ninja would, in all likelihood not wear a German World War II helmet or a faded, marked blue jean vest covering a black T-shirt. The type of motorcycle and style of driving produce different dress codes. As one motorcyclist who owns three different makes of motorcycle described:

> My image depends on what bike I'm riding. I have a sportier image on the BMW, more laid back on my Harley and a more rugged image on my dirt bike. My choice of clothes on the vehicle accent that. For the BMW, riding leathers create a BMW image. I wear another jacket for the Harley—a lighter one—and mostly no jacket for the dirt bike.

There tends to be variations of clothes which permit the expression of individuality qua image within the basic structure of motorcycle riding. They make a statement to themselves and to others of who they are.

Motorcycles and Aesthetics

The aesthetic attitude is usually viewed in terms of passive contemplation of the immediately given, direct apprehension of what is, uncontaminated by any theoretical constructs isolated from echoes of the past and from all threats and promises of the future (Goodman, 1980). Aesthetic experiences conjure up a special kind of feeling, pleasure and satisfaction. In fact, the aesthetic aim is satisfaction of general emotion. Emotion as aesthetic experience is a means of discerning what properties an object or experience has and expresses.

It must be stressed that emotions function cognitively in combination with one another and with other means of knowing. According to Goodman's (1980) perception, conception and feeling intermingle and interact to form an alloy of experience. This material, dynamic and sensate, reflects a scheme of reference based on a persons' interests-at-hand or motives.

With reference to Schutz (1973), the act of aesthetic experiencing is built upon in-order-to motives. They give direction to motorcycle riding. They form the pillars on the meaning of aesthetics—of motorcycling.

Discussions with motorcyclists suggest that aesthetic values are deep affinities contributing to in-order-to motives for riding. Following are some common in-order-to motives provided by motorcyclists when they were asked to complete the phrase, "I ride a motorcycle in order to . . . :

1. Have a physical thrill and a mental thrill.
2. Have fun.
3. Play.
4. Have fun cruising around.
5. Be peaceful, kind of lay back.
6. Feel the breeze in my face, smell the fresh air, flowers and environment around me.
7. Be at one with myself, the machine, me and the environment.
8. Enjoy the freedom.
9. Entertain myself.
10. Get out and have a good time."

Motorcyclists tend to ride for the joy of it. They are not as much practical as they are playful and compulsive. Feelings, senses of movement, existential pleasure, satisfaction, and free association symbolically cobble the road of rider motivation. They are recurrent themes stressing the need for "inherent pleasure."

Freedom is a concept so relevant to motorcycling, whether it be dirt bike riders or Gold Wing operators, that inevitably, motorcyclists reason through their biking activities in terms of "freedom to." As one rider stated simply:

> I'm a guy who likes to be free. A guy who likes to get away, who is a little bit off the mainstream.

Individualism and freedom became interrelated. Motorcyclists, when speaking about reasons for riding, stress freedom from external restraints. The restraints may be the collective mainstream as suggested in the previous quote, or they may be directly related to the mode of transportation:

> On a bike I'm more free, relaxed. Don't have all that metal around me.

> Sitting in a car is like sitting in an armchair watching TV. Sitting on a bike is like gymnastics, exploring the limits of performance.

> To have a good time. It sets you apart from other people in cars, people who need four wheels . . . .

> It's freer, it's being cool, if that's the right word. It feels diff. It's neat. It's really a feeling of self-expression, being free.

A colorful description relating freedom to escape was presented by the following self-defined "biker" (Harley rider):

> Just to have a good time. Escape essentially. The best way to explain it—you have a fight with the old lady and you leave. You're driving down the road doing about 30 mph—right. And you're uptight. You come to the first car and you say—I'm just gonna pot the whole time and you pass the first car. Then you pass the next and the next thing you know you aren't worried about anything else—you just roam. You have to do it to know what I'm talking about—right? That's the only way I can describe it.

The underlying premise of motorcycling as an aesthetic experience may be the passion to find ones' personal identity. This search for autonomy, at least through motorcycle riding, does not allow easily for taming the rider. The very idea would be enough to elicit demonic laughter from bike riders. They ride for the exaltation of the senses, to challenge themselves on the open road, to be masters of their own fate; in short to be rebels, individualistic and free.

So often, to be free and rebellious means to go fast. As one rider expressed, "I gotta rev out, and sh— like that. I just like to bob and weave—you know." Fast driving becomes the experience for self and demonstrates to other road users the intuitive sense of danger, excitement and vehicular voyeurism. Willis (1973) explained that high-speed riding with competent manoeuvring amplified the image of power and freedom into the vulnerable zone of human sensibilities. Changing lanes with mastery shows the other road users that motorcycle riders can handle themselves with ease and confidence. It makes for a smooth, visible performance, not "intimidation." To be cool is to exhibit a definite form of expressive control during the performance of motorcycle riding. The control requires body arrangement—its carriage, litheness, slope, deftness and grace.

Following Laing's (1969) thesis of giver and receiver, it could be said that in terms of image, motorcyclists are givers and motorists are receivers. Motorcyclists' identities of cool, freedom, escape, rebellion, carefree depend on collusions with others. They display the identities; the motorists receive them. How other road users identify the aesthetics of motorcycle riding is hereby exemplified:

> A free spirit type of young person who just wants to do what he wants to do.
>
> It's fashionable to speed for image. Motorcycles today are faster, flashier, you know there's a whole line of clothes just for motorcyclists, all sorts of hardware. These are their images. I have to say I have a lot of negative feelings towards motorcyclists, but then I have a lot of negative feelings about car drivers too.
>
> People seeking excitement with high speed driving.
>
> Irresponsible heroes, zooming in and out anytime.
>
> Mostly young guys. They want to find out the *feel of it*.
>
> Murdercyclists. Lots of people who drive motorcycles are sane but a lot are insane. They like fresh air, wind, the outdoors. But lots of them ride motorcycles for their own image, to race like hell.

They like to think that they're braver, and they have to be on a motorcycle.

Special breed, sporty, thrill of acceleration and speed.

They ride for the pleasure and freedom.

Of interest is that riding style, which displays the aesthetic moment, varies. The motorcycle gang members sit back on their choppers to provide a sense of bonhomie and bravado. The riders make no attempt to minimize the drag effect of the wind. Jackets if worn, are open, and jeans are not tucked into boots. Sitting upright, hand and arms level with their shoulders, the gang members ride to amplify thrillness, confidence and heightened emotions. This position increases drag, and ironically limits the top speed of the bike (Willis, 1973). However, this position improves handling ability, dramatically increases the sensation of speed and provides an image of competence and power.

The sport bikers have different versions of aesthetic images during their rides of freedom. Lowered handle bars, tiny windscreens, back-mounted footrests on 1,000 cc plus motorcycles, force the rider to virtually lie flat along the bike and present a minimum surface for wind resistance. Streamlined leather clothing with high technology helmets provides an image of uniformity, anonymity, and featurelessness. The rider becomes a technologized extension of a streamlined high powered motorcycle. For some, the rider is macho. The clothing and streamline accessories of the motorcycle present minimum surface for wind resistance. Combined, they accentuate anonymity as the preferred look. Such riders are seen as, "road racers driving at extremely high speeds keeping their wits strong." A common theme concerning sport bikers is that the machine itself is advertised as a speed machine:

> Lots of people like to go fast. It's a rush, a feeling. Looks good. Big deal. The Japanese bikers came on to this. They advertise 11.4 in a quarter mile. They're saying come on down and try her out and see how fast we can get her to go. It's not the person riding. They're advertising let's go fast.

Helmets are considered part of the image on the bike. They are expensive. They look good and fast. As one respondent said, "the helmet I wear gives me the Ninja look."

Safety and Motorcyclists' Reality

Glancing back to the description of motorcyclists and riding, it has become apparent that most ride for such aesthetic qualities as excitement, exhilaration, pleasure, freedom, challenge, play and thrill. Underlying these qualities are strong elements of spontaneity, self-expression, and individuality. They make-up the "natural attitude," the shared understandings that distinguishes them from non-motorcyclists. As one rider stated:

> You gotta do it to know what it feels like. Hard to just talk about it.

To help make sense out of safety and motorcyclists, it may be useful to start with the assumption that motorcycle riders share a collective belief in the "cult of the individual." Individualism is the core of morality in the motorcycle riding world.

Safety legislation is used to support conformity to the ideologies of the majority. It is designed to regulate behavior. Anyone who deviates too much from the law challenges the order and will suffer negative sanctions. Laws concerning safety restrict individuality and freedom. They are intended to enable people in a society to behave in a way conducive to the best interests of all.

Traffic laws are divided into three distinct areas of a motorcyclists' activities. First they define behavior in the active operation of a motorcycle. The behavioral laws are uniform for all motor vehicles, of which the motorcycle is one. For example, all motorists must stop at a red light and stop sign, not pass on a double solid yellow centre line or drive above the posted speed limit. Such laws have rational efficacy for automobile drivers and motorcyclists. For example, people may on occasion run a stop sign when they are in a hurry and so invite the possibility of a crash, but they do not therefore advocate the abolition of stop signs. Regardless of feelings of individuality, stop signs are considered useful to everyone. Similarly, traffic lights control traffic flow in a precise, ordered way. Thus people stop on a red light and proceed on a green one, not only because they are indoctrinated but because they recognize this kind of regulation is designed for safety and order.

The second group of laws relates to the vehicle. Cars, trucks and motorcycles must be in mechanically good condition to meet road, behavioral and environmental circumstances. Brakes, tires, mufflers and so forth must be in good working condition. At this point, motorcyclists tend to deviate somewhat from the law. Specifically, the roar of many motorcycles directly contradicts the law on noise. Some motorcyclists said that they like to:

> Have straight pipes so people can hear them at intersections.

> Rev out to let them (other people) know what I'm all about.

Other people notice, whether it be in their cars or in their residences:

> I don't like noisy mufflers. You can hear them twenty miles away. Noisy bikes should be outlawed. Given this is one way they make themselves noticed, they make a nuisance of themselves.

> Some want to be noticed by revving the engines . . . They're normally impatient.

As an aside, members of a police force detachment indicated that most of the dirt bikers make noise which exceeds the legal limit. The problem is to catch the riders with testing equipment, which, apparently is rather expensive to purchase for something seen to be more of an inconvenience than a danger.

The third set of laws is most relevant to motorcyclists. The laws directly affect individuals' physical turf, their bodies, and their clothing. As previously described, clothing helps people be like and unlike other people, to conform to the norms of society and at the same time to express individuality. As Bierstedt observed:

> Most normal individuals consciously or unconsciously have the itch to break away in some measure from a too-literal loyalty to accepted custom. They are not fundamentally in revolt from custom but they wish some law to legitimize their personal deviation without laying themselves open to the charge of insensitiveness to good taste or good manners (1970, p. 244).

The most contentious feature impacting on the self is the helmet. Helmets are intended to protect the head, brain and skull. According to Newman:

> To prevent head injury we must: (a) minimize the violent movement of the brain within the intact skull; and (b) minimize the probability of skull fractures.

> To accomplish the first objective, we must, from a mechanical point of view, minimize the energy delivered to the brain by somehow "softening" the blow. To accomplish the second, we must distribute the loading over as large an area as possible. Nearly everyone has tried to see how hard he can squeeze an egg in his hand without breaking it. The trick is to load as much of the shell as possible and to avoid local high-pressure points. That's why the ring should come off. Helmets attempt to accomplish both these objectives, not with eggs but with heads (1982, p. 4).

In Canada, the manufactured helmets undergo certification for a number of different standards. The four most common ones are CSA-D230, ANSI-290.1, SNELL, and DOT MVSS-218. The four standards differ only slightly. They try to accomplish the same thing—to ensure that the helmet will help save the rider's life, or to reduce the head injury levels if riders are in accidents.

In order that mandatory helmet wearing laws become accepted by motorcyclists, two factors must be appeased. First, there needs to be a belief that safety measures are in fact safe. That is, motorcycle riders must recognize that a situation is more unsafe without a safety device than it would be with a safety device. The people who deliberate on safety standards are usually experts, politicians, bureaucrats and researchers. They tend to define the universe of safety vis-a-vis a certain product or process.

The second factor instrumental for helmet wearing is to overcome the fundamental belief system structuring motorcycle riding. That is, how can an organization of people participating in an activity for freedom, individuality, thrill, and escape be encouraged to abide by a law which may be at odds with that belief? As was already established, clothing is a personal choice, one which encourages variety and expresses individuality. If you ride to escape conformity, you delight at looking free. A helmet is a symbol of external constraint. It becomes what the rider wishes to escape; conspicuous mandated conformity.

The question then becomes not the extent to which helmets are safe, but rather the extent to which the meaning of helmets contradicts the bedrock meaning of riding. Choices become a major issue. Hence, a high profile argument is that the government should not force individuals to protect themselves. The universe of all people and democratic rights for choice becomes the major emphasis, not safety for an individual. The pragmatics of riding are subjugated to the political/philosophical agreement. Social and existential factors, rather than empirical safety factors, are key. Consider the following classic motorcyclist responses to the question, "Do you wear a helmet?"

If I have a choice, I don't. Normally I don't. I like to just walk out of my house, get on my bike and ride. It's a thing to it, it's no preparation. F— all like putting on your seat belt. Just get on it and go, the way it should be.

I will be this weekend. I prefer not to though. Don't like 'em. Basic freedom of choice. If I was racing at Westwood I would. If I was drag racing I would but there's something about 'em on the street I don't like. I don't like to have anything on my head. I just like to feel in touch with everything that's going on.

It is definitely freedom of choice.

I just feel that governments got their nose in enough of our affairs. You don't need it with helmets.

I have to. But I prefer to have a choice. Like anything else the last few weeks, especially that's been a topic of conversation quite a bit with friends of mine. Lots of talk around.

If I had a choice, I'd say I probably wouldn't except if the weather was bad. The helmet is definitely safer wearing one. But that's a choice thing.

Motorcyclists regard the helmet-wearing laws in terms of fulfilling obligations. No doubt they distinguish their helmet wearing as merely a legal duty. Randomly-selected people interviewed by The Province newspaper (May 8, 1987, Vancouver, B.C.) provided choice-safety accounts:

It should be up to the individual. We have rights. Anyone can tell you that helmets are dangerous because they impair vision and hearing.

If I was a cyclist, I'd want to wear a helmet. But to be forced is against personal freedom.

I'm pro-choice. Helmets should be worn by youngsters in motorcross but, for those over 30 or with a number of years' experience on cruise-type bikes, there should be a choice.

A group of outspoken motorcyclists chafe at the helmet laws. They are much like Kant's illustration of a dove who, as he flies, bemoans the resistance of the air, thinking how much faster he would go in a vacuum. Consider the following:

I don't wear a helmet unless it's compulsory by law. Because they're not designed to protect against anything but the skipping blues and low speed impacts. They impair vision, hearing. They're an encumbrance—the added weight to your head causes fatigue and heat builds up and for the amount of protection you get from it, for what you have to trade off I believe that they're dangerous and I'm not prepared to trade that off if I don't have to. So, I don't wear a helmet unless I have to do it and then I'll wear the most minimal amount of protection that I can get away with under the law. Too much to ask me to give up my senses to protect me from a few stitches.

Not if I didn't have to. I just don't like them. You can't hear out of them. They restrict my vision and you can't hear out of them. I personally don't like them.

To each their own right. Everyone's into their own thing. Now I do, it's the law. It's too heavy, it's too hard to see. I have a hard time with that.

Negative factors given are:

1. Helmets diminish hearing ability, thereby preventing the wearer from recognizing important sounds in the traffic environment.
2. Helmets impede the wearer's vision, thereby excluding part of the visual field.
3. Helmets are heavy, thereby contributing to fatigue and to a reduction in rider performance or concentration.
4. Helmets cause neck injuries.

As in any organization of individuals partaking in a definable activity, disavowal of the thesis that not wearing helmets is "a way of life" occurs. A broad segment of motorcyclists do not recognize the helmet law in terms of ideologically defined freedom or an attack of self-expression. The dominant position is safety, often cited within sedimented history. So often, personal recollections of past events become the truth slogans. More than a few times experienced touring bikers shared their history of a close call or near fatality. To them, safety is experience. Experience is subjective truth. Subjective truth leads to practical acts. The following naturalistic accounts reinforce the vitalism between biography and decision-making.

> Yep, wear it. Well, the night I had my accident . . . This is no s—. I left my place. Didn't have to wear no helmet. From my place to the main road, closest where I live at that point stopped, put on my gloves, helmet, jacket. I ditched my bike, rolled, scraped my helmet, scraped my gloves, opened the shoulder on my jacket. I know if I hadn't been wearing any of these three things . . . If I hadn't been wearing my helmet, my head would have hit the gutter. Had a headache for two days. That's the truth.

> I wear it all along even when there was no helmet law, I wore it. Even back in Manitoba where it wasn't required. Its safer that way. Anyone without is crazy. Same as people riding around with T-shirts and shorts. I got hit once by a car and wiped out a couple of times. Helmet helped. So . . .

Willing belief in personal experiences has produced volitional decisions for some motorcyclists to wear helmets. Many other riders, broadly grouped as sport riders or sport-rider-look-alikes wear helmets as much for image as for safety. They manage the debate of safety and freedom by stressing looks and sport bike recognition. The laws of the province are upheld, the image is saved and the wearing behavior is accepted by other bike riders as being cool. It is a total image-maintenance choice.

Summary

An analysis of motorcycling is like an analysis of any social organization. Few surprises and much common sense! The common sense of motorcycling reflects the seen-but-unnoticed thesis. That is, there are threads of human behavior which are taken-for-granted because they unfold in all people—with different meanings.

One of the seen-but-unnoticed features of life is the social value of peoples' claims through other people. How do they define themselves in relation to others? In the motorcycling world, there tends to be two predominant images. Harley Davidson riders and others. Images of Harley riders as being "outlaws," "lone riders," or "the coolest," were supported by judgments and evidence given by a number of motorcyclists. Harley Davidson riders are part of the American Dream—a little rebellious, independent and free. The motorcycles are made in America and not in Japan or Europe. That is important to Harley riders' images.

Harley Davidson riders are more likely than other motorcyclists not to wear helmets. Most often, they believe that a helmet is an infringement on freedom of choice and that it is uncomfortable. In addition, they tend to disagree with government officials' versions of safety and they consider the helmet to be antithetical to their image.

Other riders with distinguishable images of selves are sport bikers, Gold Wingers, touring bikers and dirt bikers. Sport bikes are typically Japanese. They are fast, sleek, low and powerful. Their market image is a symmetrical oneness with the riders whereby they wear matching leathers and high technology helmets. Whereas the Harley bikers consider helmets as inconsistent with image, sport bikers tend to wear helmets because of image. Gold Wing riders and other touring riders prefer to wear helmets primarily for reasons of safety. They tend to be the most conservative operators in the motorcycling world. Better safe than sorry! Better comfortable than sleek!

Regardless of what image motorcycle riders have, a near concensus suggested in responses is that they ride for feelings of freedom, enjoyment, thrill, fun and play. The motorcycle is more of a recreationally-defined vehicle than it is a practical or economic unit. With this definition comes behavior such as speeding, racing and weaving—actions that have created a negative stereotype among motorists and some motorcyclists alike. In fact, selected motorcyclists believe that they are duty bound to ride appropriately for their own image and the image of the collective motorcyclists.

The individualistic mainstay of motorcyclists forms the bedrock for opposition voices to helmets. Safety legislation such as helmet-wearing laws symbolize law, order and conformity. They directly contradict the motorcyclists yearning for freedom and individualism. So, freedom of choice becomes the battle cry.

There seems to be little doubt that image of self and others plays a significant role in riders' behaviors. Dress, choice of motorcycle, reason for riding, and relationships are all seen-but-unnoticed factors, which influence riders' motorcycling styles.

CHAPTER 4
A MOTORCYCLE RIDING COURSE

J.P. Rothe

Preface

In the literature review on motorcycle evaluation research, Sylvia Fockler indicated that past studies lacked in-depth descriptions of how motorcycle rider training programs are experienced by course participants. This shortcoming limited the extent to which researchers could link the everyday nature of a process to "specific aspects of program effectiveness."

To compensate for the inherent weakness of former studies and to provide a basis of understanding the meaning of the category "trained motorcyclist" appearing in Peter Cooper's statistical analysis, we produced an emic description of a motorcycle rider training course. We, so to speak, took motorcycle training out of the closet of assumed activities and gave it a public face. Upon the invitation of Mr. Brian Lowes, Program Manager, British Columbia Safety Council, we engaged in a participant observation. Based on the report the safety council has made significant changes to the training course's objectives, pedagogical activities, instructor training procedures and evaluation designs.

Introduction

Any driving training course is designed along Weber's (1947) type of social action called Wertrational. It is a series of activities organized around institutional norms and practices. Behavior is judged according to how successfully do students adapt to the norms of "safety" and to the manipulations of riding. The extent to which the norms and practices are made familiar enough for students so that they may successfully complete the course is a primary concern.

It is by looking at the actions, structures and behaviors that we begin to perceive: "what people do in motorcycle riding courses," "why they do so," and "how do they proceed towards completion." At the same time we recognize how courses are structured according to the canons of the situation. That is, how do the instructors perform expressive acts in the field which are formally outlined by the sponsoring agency? How do instructors and students come together? How do they share knowledge, experience and insight to form a network of interconnections between persons who are brought to the situation on a business basis? Finally, we are interested in establishing what students are expected to do according to the agency's scripts, everyday scenarios and approved boundaries of behavior.

The report that follows begins with a description or methodology. The portrayal of the emic is organized according to wants experienced through time. Analytic details were inserted wherever it was deemed appropriate.

The motorcycle training course described on the following pages represents but one of the courses which are currently available to prospective riders in British Columbia. Also, since this study was conducted, changes have been made in course style and content. The intent of the following text is to portray the conduct of a specific course of instruction and to describe a typical learning process to which those desirous of motorcycle training are exposed.

Methodology

The emic reflects the everyday life of a motorcycle rider training course. A method for producing accurate information on the everyday reality of such a course is the situational study. A description of the methodology used in this project follows.

Situational Studies

Purposes for Situational Studies

A situation like a motorcycle training course consists of a physical setting and natural interactions amongst and between students and instructors. Within such a situation there are social rules of behavior, individuals' attitudes, daily interactions, expectations and disappointments. These circumstances are key influences in the motorcycle training "program-in-use." How an organization trains instructors, where the courses are held, who the students and instructors are, how the instructors relate to materials and students, and what testing procedures are used, influence the style, form and possible success of the training program. These, and other factors, contribute to how instructors define various features of the program (e.g., objectives, student activities, classroom lectures, evaluations, etc.) and how students judge the worthiness of a program and learn accordingly. Situational studies are designed to extract such influences by, so to speak, describing slices of a program reality.

Objectives of Situational Studies

Overall, the purpose of situational studies is to provide an interpretive account of features which influence people's experiences with a

program. It is designed to describe how a group of individuals in a particular situation interpret a program implicitly through behavior and explicitly through talk. In particular, information may be sought about contextual factors such as location, biography, social and economic standing of the students (families), and structure of courses (e.g., staff and student roles and responsibilities, curricula, learning strategies, etc.), and the activities and attitudes exhibited by students and trainers as they participate in course activities and interact with peers and other relevant individuals.

Selection of Situation

The situation for analysis was composed of a beginner course at a local university and a follow-up traffic skills course at a regional vocational institute, both held in October, 1985. As an incentive, successful completion of the beginner course leads to the removal of restrictions on the British Columbia motorcycle learner's permit. Passing the traffic skills course provides the students with a class 6 driver's licence (motorcycle permit).

Research Procedures

The research activities were "undercover." The instructors and students did not know of the researcher's involvement in the course as a participant observer. The only people who were aware of the study were the course management personnel. In fact, the research procedures were with their full knowledge and approval. For five days the researcher became a student and experienced the situation accordingly. Throughout the training days, observations and informal interviews were activated.

The interviews were in the form of casual conversation so that additional information could be gathered and original impressions could be verified or corrected. During the program observations, the participant observer attempted to note the everyday nature of the class by observing circumstances such as students interacting with instructors, teaching styles, mishaps, student frustrations, and so forth. The observer became a student who, along with other students, acted freely according to the program guidelines and attempted to successfully complete the program.

During breaks the observer wrote field notes and recorded observations on a cassette tape recorder. These were reviewed in the evening for a first round analysis.

The findings were reported to be:

1. Faithful and consistent with the researcher's experiences as a participant in the situation.

2. Faithful representations, descriptions, accounts and interpretations of other participants.
3. A faithful account of what activities were like in the situation.
4. Understandable to readers to the point they can become players after reading the description.

The report is written in two parts. Section I includes a description of the observer's involvement in the motorcycle activities. It is written from the perspective of an average student. First person feelings and observations are included. Section II involves an analysis of data used in the write-up. An objective review of events is produced.

Section I Description of Participant Involvement

Preliminaries

After the decision was made to enrol in the motorcycle course a telephone call to the sponsoring agency was made. A representative asked whether I had a legitimate provincial learner's permit, had ever ridden a two-wheel bicycle (for balance purposes) and what was my age. Costs, locations and times were then discussed. To receive an official road test recognized by the provincial Motor Vehicle Department for a class 6 driver's licence (motorcycle licence) I needed to enrol first in a novice rider course and, subsequently, in a course for teaching traffic skills.

The brochure for the novice rider course outlined that the successful student will be ready to enter the traffic environment. The 22-hour novice course covered the following topics:

1. Basic controls.
2. Engine procedures.
3. Balance and braking.
4. Speed control/gearshift.
5. Cornering techniques.
6. Basic maintenance.
7. Traffic tactics.
8. Special road conditions.
9. Consumer orientation.

The 15-hour traffic skills course was designed to be an extension of the novice rider course. Through classroom learning and riding practice, the student will learn to:

1. Anticipate problems.
2. Avoid rider hazards before they become critical.
3. Handle traffic situations and different roadways.

The novice rider course was scheduled for three weekend days in October. The traffic skills course involved two weekend days later that month.

Novice Rider Course—Day One

The Novice Rider course was held at the university's parking lot C. Although the course was scheduled to begin Saturday at 8:00 in the morning, the instruction started at 8:20. Instructors were talking to each other in loose-play fashion. At 8:00 o'clock, the five male instructors took twenty minutes to wheel the motorcycles out of the semi-trailer parked at the side of the parking lot. During this time, fourteen students stood quietly around their cars watching the instructors' activities.

Of the fourteen students, eight were males and six were females. Six students were older than thirty years of age, five were in their twenties and three were in their late teens. I was a member of the predominant age group (25 to 44) taking motorcycle training in British Columbia. I considered myself to have average co-ordination and physical abilities, below average technical competence and above average learning abilities.

The motorcycles at our disposal were dirt/street bikes ranging from 175 to 350 cubic centimetres. There were also two pure street bikes, a Honda Rebel and a Honda 250. Overall the motorcycles consisted of Yamahas, Hondas, Suzukis and Kawasakis. Decals providing the names of sponsoring motorcycle dealers were visible on some motorcycles.

Starting the Class

Once the supervisor had the students assembled, each student was requested to sign a document waiving legal liability for possible injuries. During this time, learner's permits[1] were closely scrutinized by the attending instructor.

[1] A British Columbia Motor Vehicle Department motorcycle learner's permit was a pre-requisite for enrolment in the course.

While standing inside the trailer, the supervisor of the course introduced himself, made a quick roll call and then he:

1. Introduced himself as chief instructor and the other instructors by name.
2. Stressed the events for the day.
3. Emphasized the goal of the course. As stated it was to "KNOW HOW TO RIDE A BIKE."
4. Warned that no course time can be missed. If this happens, students have to make up lost time.
5. Stated that evaluations will be informal to help students progress.
6. Informed that most of the students will continue to the follow-up traffic course.
7. Listed the retailers that donated the motorcycles. He further recommended that if any students plan to buy a motorcycle, they do so from the dealers who donated the motorcycles to the organization.
8. Outlined that students will be tested on theory.
9. Specified that instructors are not allowed to give students information on the qualities of motorcycle makes.

The five-minute talk served several functions. First, it introduced a division of labor by roles consisting of chief instructor, instructor and student. Next it placed the structure of the course activities as they relate to expectations (goal) and scheduling. Finally, it served as a marketing scheme, whereby students were informed of the dealer decals on the motorcycles, the dealers donation of motorcycles (without which the courses could not be held at the given cost to students) and the students moral duty to do their business with these dealers.

Following the five-minute talk the students were picked from the list of names and were "randomly" placed in three groups; two groups of five students and one group of four people. One student named Bruce came late, whereupon instructors joked, "He looks like a Bruce." While the supervisor addressed the group the other instructors were busy placing pylons in the form of obstacle courses throughout the upper and lower parking lots. They were intended to serve as co-ordinates to guide expected patterned motorcycle behaviors.

Group Work

Before the students moved to their assigned groups and appointed instructors, I—along with several others—rented helmets. Before we were provided with motorcycles, the head instructor suggested that all

students wear eye protection, boots and heavy jackets. Instructors set the scene by example. Two wore sports jackets and one wore a jean jacket.

My group instructor suggested that I take the Yamaha 350. The four people in my group walked the motorcycles to the far end of the parking lot where the instructor checked our learner's permits. We were shown the integral parts of a machine (e.g., clutch, brake, gas, etc.) followed by instruction on how to properly pick up a dropped motorcycle and how to kick-start it. During the start-up phase, I was not alone in becoming frustrated because the motorcycles failed to start properly. After fifteen minutes of swearing, grunting, carburetor flooding, battery wearing, trial and error kick-starting, all the motorcycles started and were left to warm up while the instructor yelled over the noise about "rider balance." We chose a partner, shut off our bikes, and then pushed each other around on a silent machine to experience two-wheel balance.

After engaging in this exercise for fifteen minutes, we kick-started the motorcycles and commenced slow riding. Points stressed by the instructor were the:

1. Friction point of clutch.
2. Use of throttle and rear brake.
3. Location of eyes on horizon.
4. Location of knees into gas tank.
5. Location of feet on pedals.

The riding course (mini-obstacle course marked by pylons) was then explained. We walked through designed events such as a straight line slalom, figure eight, tight circle and Z-turn.

To get the feel of the clutch friction point, students were instructed to practice slow-speed driving up and down the parking lot. This lasted for twenty minutes. The rule was, the slower you ride, the better you can control the motorcycle. After a series of slow rides, we began different manoeuvres around a straight line of pylons. My slow riding around the pylons was neither good nor bad. It was so-so. I was nervous. However, nervousness rapidly changed to frustration when my motorcycle kept stalling. Each time an attempt was made to start it I experienced major difficulties (that evening my ankle was dark blue from bruising). Little help was offered. Our group instructor would restart the motorcycle with little instruction accompanying his actions.

As I attempted slowly to manoeuvre my way through the pylons, I began to view riding as a "competition." I felt the urge to "beat" the pylons and thereby prove myself as the master. While I was in this competitive spirit I stiffened up and hunched over the motorcycle. Unfortunately the instructor provided me with little in-depth advice on my posture, how my psychological state led to my poor physical position, and how I could improve on both. His only input was the occasional one liner, "You're stooped too far over the bike," or "Use your knees."

A second member of my group had similar competitive feelings. She admitted that because of her previous motorcycle riding experience she felt that manoeuvring around the pylons was easy. She wanted the rest of the group to see how easy it was for her. She wanted to be seen as the best, the most competent rider in the group.

When the motorcycle continued to stall, the instructor, showing some annoyance (I do not know whether at me or at the condition of the motorcycle), suggested that I find another motorcycle. So I walked the unco-operative machine to the trailer where another instructor, watching the procedures on the parking lot, presented me with a Honda Rebel 250 with an electric start. The man advised that the motorcycle was not built for slow-riding manoeuvres, however, because there were no better bikes available I had no choice but to use this one. One push of a button started the machine. I rode back to where my group was practising.

The group instructor approached me and suggested that with this motorcycle I "play the clutch" and "press the throttle." The Rebel's relationship between clutch and throttle was very different from the Yamaha dirt/street bike that I had used previously. The low build of a "chopper look-alike" motorcycle with exaggerated front forks made manoeuvring through the pylons awkward and frustrating. The group instructor kept telling me to try my best, since he judged the machine as "not a good bike." Yet he appeared to be unaware that my inability to handle the motorcycle caused me frustration, resulting in clumsy riding results.

Throughout the morning, group members rode around, through and, at times, over the pylons. We were observed by the instructor, who on specific occasions stopped the group members and brought them together to describe common mistakes or to advise on useful techniques. Also, throughout the exercises he stopped riders individually to correct errors (always skills related). I was criticized for looking directly ahead of the front wheel, rather than looking further ahead to where I wished to go, while negotiating the circle, doing the figure eight, or attempting the slalom.

At 11:50 a.m. we returned the motorcycles to the trailer, where instructors evaluated their group members according to specific skills. When the evaluation sheets were distributed for student initials, there was no time scheduled for discussing the evaluations, student frustrations, questions, concerns, and so forth. Some of the students, who desired interaction time with the instructors, were deprived of the opportunity. Once the evaluation sheets were initialed, students returned them to the instructor in charge. The entire affair took about five minutes. It appears that the meaning of informal evaluation, explained in the introductory speech by the chief instructor, was to write judgments on given criteria without follow-up discussion.

Mechanics

Following a forty-minute lunch break, we spent 1-1/2 hours on basic motorcycle mechanics. The instructor covered such features as oil (uses), tires, electrical system, tire pressure, reserve gas, chains and brakes. Having little knowledge of mechanics, I found this time valuable.

The mechanics presentation took place in the parking lot. The instructor used a motorcycle to demonstrate the mechanical elements. A little bit of showmanship at this time was entertaining. For example, turning or "whipping" a motorcycle around on its side stand showed me how comfortable the instructor was around a bike. Overall, the instructor's attempt to keep mechanics at a layperson level provided for clearer understanding of the topic.

Doing Theory

Upon completion of the Mechanics session, we attended a theory lecture, which was held in a university classroom. For two hours the instructor, whom we had for mechanics, taught theory. Theory in a motorcycle course concerned rules of the road, riding situations and rider anticipation. The first thing the instructor did was to analyze idiosyncrasies between the Motor Vehicle Act and everyday traffic routines. The topic was roadway markings—specifically, yellow and white, broken and solid, double and single. Classroom instruction generally adhered to the following sequential question-answer process:

1. Instructor: Can you pass on a solid yellow line?
2. Student A: Yes.
3. Student B: No, you can't.
4. Student C: Of course not.
5. Instructor: Well, can you?
6. Instructor: Who says no?

7. No verbal response
8. Instructor: OK, now who says yes?
9. No verbal response
10. Instructor: Nobody says yes?
11. Instructor: You can't pass on a single solid yellow line?
12. Instructor: How did you all get your licence?
13. Instructor: You're all wrong. Of course you can.

The above dialogue was an example of the instructional process. Elicitation of factual information, opinions and interpretations were lead-ins for judgments consisting of student put-downs. Other students commented on the theory class with such descriptors as "boring," "demeaning," "stupid," "a drag," and "put down." From a broad contextual perspective, adults did not appreciate being judged as wrong. Many had respectable biographies based on life achievements. For example, they were well educated, had responsible jobs, drove cars, were married, had children, and had successfully met family, professional, legal and personal obligations.

Much of the questioning was prescriptive, "that's the way it is." Straight recall, one-word answers to student questions were the norm. There was little or no recognition of student experiences. So often, students who ventured forth to provide alternative interpretations of traffic were either dismissed, overridden, slighted or scarcely acknowledged. The instructor's interpretations of events received credence. Accordingly, a teacher in the student group remarked, "Why don't they get this guy to learn a few presentation skills," while another student offered, "Hey, I'm not here to be put down." Students were looking forward to the conclusion of the class.

Novice Rider Course—Day Two

The Morning

The second day of class was held on Sunday morning at 8:15. Students stood around waiting for the scheduled events. The instructors joked with each other. While other groups selected their motorcycles, our group stood around and waited for the group instructor to arrive. He failed to show up. The chief instructor was unaware that our group instructor was not scheduled to work on this particular day. After a ten-minute wait, the chief instructor suggested we select motorcycles from the ones remaining. Other groups were already practising their slow-ride manoeuvres. The chief instructor later said that the logistics of who was to teach today was "all screwed up."

The chief instructor took charge of our group. The motorcycle I used this time was a Honda 175 dirt/street bike.

One of the students in our group failed to attend, leaving us with three members. After pre-inspecting the motorcycle, I again experienced difficulties kick-starting the motorcycle. The supervisor took the motorcycle and with one kick he had it going. It was difficult to understand how the chief instructor followed the same procedures I did yet started the machine so easily. While the other students were already practising slow riding I was becoming frustrated trying to start the machine. At the end of the riding session the instructor outlined my error. Rather than kicking straight through with sufficient force, I placed the force of the kick sideways.

The pylons were again placed to facilitate obstacle courses. During the practice session with the pylons, my group received two new members from another group. They were more advanced in riding skills than the other students in their group. Three students (two women and a man) were left to continue basic skills as a separate group. During the morning we practised shifting gears, doing pressure steering and practising slow-riding manoeuvres.

Gearing exercises consisted of starting in first gear, speeding up, shifting to second gear, and gearing back to first when the instructor signalled. The intent was to engage in this activity without braking, to keep a constant speed, and to retain maximum revolutions per minute without losing power. The high revolutions of the motorcycle resulted in a loud whine. This appeared unnatural like an overrevved car engine. To compensate for the high whine, I braked. This was corrected by the instructor. After a few more attempts, I did the manoeuvre properly. However, the high whine still seemed foreign to my car driving experiences. The instructors did not link into the students' experiences to explain the difference between automobile and motorcycle engines.

As the morning progressed I failed to co-ordinate the friction point of clutch and throttle with precision. There were variations in the instructors' approaches. For example, when I was on the first motorcycle, I was instructed to give the clutch maximum play. On the second motorcycle, the same instructor told me to give the throttle maximum play. The second instructor suggested that rather than giving maximum play to the clutch, I ride on the friction point. Frustration again became noticeable. First there was the trouble with kick-starting the engine and now I was told that I was doing things wrong which the previous day were considered correct. Seeking ultimate control, I began to hunch over the motorcycle and began to press, further

decreasing manoeuvrability. After repeatedly hitting the slalom pylons, I was ready to quit. At this point the chief instructor suggested I relax and take a break. I did not take up his offer.

For the time remaining before lunch we engaged in high speed/low speed, and kill-switch exercises, after which we received our second round evaluation forms. I was surprised at my evaluation. Although the evaluation was very good, there was no feeling that I did as well as I could. As on the previous day, there was no discussion over the report. There were no reasons given for the reports, their worth and their eventual usefulness!

During lunch time, the instructors congregated around the trailer while the students lazed around their cars. Little instructor-student interaction occurred. Classroom theory was scheduled from 1:15 to 4:00 p.m.

Afternoon Theory

During afternoon class, the instructor provided an extensive description of space cushion, which is the area that motorcycle drivers build around them for increased safety. Simple question-answer routines were used. Topics covered by the instructor were:

1. Motorcycle driver giving himself options.
2. Two-and twelve-second rules.
3. Blind spots and visibility.
4. Murphy's Law of potential hazards.

The concept of selected vision was discussed after Murphy's Law. The instructor recommended that motorcyclists should attempt to have eye-to-eye contact with car drivers to make sure the car drivers have seen them. I proposed a counter argument by suggesting that eye-to-eye contact is difficult, if not impossible since drivers would have difficulty seeing a face behind the helmet face shield at a distance of 100 metres or so. Also, I explained that research on eye-to-eye contact between pedestrians and drivers shows that when drivers make eye-to-eye contacts with pedestrians, they realize that the pedestrians are aware of them, and therefore the drivers feel it is safe to proceed normally. The onus on precaution is on the pedestrians. Drivers continue on their course assured that pedestrians are visually aware of them.

The discussion point was acknowledged by the instructor with a "maybe" and then dismissed with the shrug of a shoulder. No counter rationale was offered. Ten minutes later the instructor again emphasized that motorcyclists should make eye-to-eye contact with drivers. Much like a school student, I felt that my strategy from here-on-in was to remain silent.

The question-answer session included other examples whereby students were not recognized for their input, were cut off in discussion, or were receiving negative replies. In fact, at one point the instructor said, "I can't teach you anything you don't want to learn." For the next thirty minutes the instructor lectured on the following topics:

1. Intersection dangers.
2. Curves.
3. IPDE system (Identify, Predict, Decide, Execute).

Prepared overheads and the blackboard were the resources used. A twenty-minute film on IPDE followed a lecture on the same topic. During the film, the instructor left the classroom. When he returned, there was no discussion or analysis of particular situations witnessed by students in the film. Instead, the instructor continued on new topics such as group riding, protecting yourself, staggered riding and selecting appropriate passengers with whom to ride.

At 3:50 p.m. the instructor suggested a five-minute break. Students refused as they wanted to leave by 4:00 p.m. The instructor continued to follow the question-answer routine on the topic of tires and brakes (by this time only two students kept answering). At 4:15 p.m. students were preparing to exit. Once the instructor completed his talk on brake fading, students hurried out of the classroom.

Special Side Events

Before theory class commenced, some students were discussing a situation which occurred in one of the practice groups. During the morning ride a young female student was given the Honda Rebel. This was the same motorcycle which gave me trouble on the previous day and which instructors felt was a difficult machine for manoeuvring. The woman nearly hit the parking lot embankment. During a class break she discussed the episode.

While she was in first gear she "got the throttle caught." At maximum speed in first gear she headed straight towards the embankment. Because she had not learned to use the kill switch, she "raced along" in first gear waiting for the last minute to turn and drop the motorcycle. She told me that she was "really scared." When the instructor walked over to the mishap his first concern was the motorcycle. According to the student, "he thought that would be it for the bike." He told me, "Don't do that again." When I asked what she did wrong, she responded "I have no idea."

Although the experience was very frightening, the woman was expected to ride the same motorcycle for the next hour. According to her, the instructor refused to talk to her after the incident. Finally she asked for a different motorcycle, one which was easier to handle. She received it.

On the same morning, one of the students brought his own motorcycle to class. A friend accompanied him on a powerful motorcycle. During break, students were resting around their cars and instructors were sitting on a curb. The student's friend roared his engine, turned a wheelie and ran a stop sign. This was both unsafe and illegal! Also this particular rider was responsible for the student rider who, at the time, only had a learner's permit. This motorcyclist, responsible for a student in the course, did a number of manoeuvres contrary to safe motorcycle riding. The instructors made no mention of the poor and dangerous riding. One of those "teachable moments" so many teachers aim for was not extended into the instructional plan.

Novice Rider Course—Day Three

Morning

For day 3, our group had the same instructor as we had on day 1. This was the day of the skills test. Throughout the morning we were continuously reminded of it. The student who failed to attend day 2 once again was missing. Apparently he quit.

After the learner's permit check, helmet rental, and motorcycle pre-inspection were completed, slow manoeuvres were again practised. Also, fast speed turns, swerves and emergency braking were taught. Throughout the exercises the instructor took students aside and individually praised them or pointed out errors in driving with the continual emphasis on the upcoming skills test. I spent a significant amount of time practising slow-riding manoeuvres. I did not want to fail the skills test because too much pride was at stake. Students were talking amongst themselves about the big upcoming event. THE TEST!!

The testing began at 11:30 a.m. Out of an original class of fourteen people, one student had quit after day one, three students were considered unsuitable for testing. Three riders would subsequently fail the test.

The test was split into a low and high speed course. The low speed test consisted of starting from a designated box, slow riding through a narrow lane of cones, a tight circle, slalom return and a stop in the original starting box.

The high speed test course consisted of a start, a right turn, a gear shift through an extension of pylons, a tight turn around a cone, a return ride through pylons and a complete stop in the stop box. The high speed manoeuvre was timed for 35 seconds. I did well on both test 1 and test 2 (only one demerit error for popping the clutch).

Our group had the chief instructor as head tester. He comforted each student before the start (e.g., good luck) and gave a few confidence building comments after each student completed the test course (e.g., nice going). This was very reassuring at a stressful time. When a second instructor (the same person who taught classroom theory and mechanics) proceeded to test students there was no evidence of him calming, reassuring, or offering a few words of comfort to students after the test. In a business-like fashion, he called out the official number of demerit points after a student's run.

Once the skill-testing session was completed, our group returned to the far parking lot to discuss passenger riding. In a group session, the instructor explained proper clothing for passengers and passenger responsibilities. Since we had to prepare for our next theory class, there was a shortage of time to practise riding with a passenger.

After the cones were collected by the students, we returned to the trailer, where we again initialed the evaluation form. We had lunch and proceeded to the classroom. Before class I asked students about their test results. One older man stated he failed because he did not stop in the stop box. He did not like the second tester. He felt degraded, since according to him, he never failed at anything. A young lady ran the stop box and knocked over countless pylons. She failed. A third lady, 35 years old, also failed. She was bitter.

According to the student, on the first day of the program the instructor approached her and bluntly said, "Just because you're a woman don't expect to get treated any differently." This shook her up. That same morning she dropped the motorcycle four times. The instructor proceeded to yell at her. The student's confidence was so shaken that she complained to the organization's head office. For an additional fee she was allowed to practise with another instructor. According to the student, she could not regain the confidence to pass the test. She failed. She felt cheated. She was told that she could not retake the test.

Afternoon Theory

The afternoon theory class began with nine students. The number changed to ten with one latecomer. Three students missed class because they were still practising for the skill test.

The afternoon class consisted of a review of space cushions, intersections, IPDE system, skidding, large vehicles, fatigue on long trips, passenger riding, motorcycle maintenance, helmets, and clothing. There was no connection between the class and the skill test that was just completed. It was a motivational letdown. Students wanted to know about the restrictions on their learner's permits, and the official test results.

At 3:00 p.m. a film on safe driving was shown. The film stressed Murphy's Law, "If the unusual can happen, it will." Again little time was spent analyzing, synthesizing or evaluating the film. The only reference to the film was the portrayal of two "obvious mistakes." One was that a rider should use the kill-switch and clutch simultaneously rather than first engaging the clutch and then using the kill-switch. The second error shown in the film and briefly mentioned by the instructor was a motorcycle rider who was driving in the centre of a lane. No further interaction about the film developed.

Shortly after, the students received a paper and pencil test. There was no mention about its value, reason for distribution and use of results. As students completed the test, two of the missing students arrived. They were pleased because their extra basic training helped them pass the skill test. After about 15 minutes the paper and pencil tests were reviewed. The students kept their own copies. A simple question-answer strategy was used. Towards the end of the session, only two students were answering the questions. Little enthusiasm was visibly shown for the exercise.

At 3:55 p.m. the chief instructor took over the class and provided each student with an envelope containing a certificate, a form which officially withdraws the learner's permit restriction, various pamphlets, and a helmet sticker. People who did not pass the skill test received only the pamphlets. Towards the end of the class the chief instructor signed the certificates and asked the students to clap for the theory instructor's first attempt at classroom instruction. Several polite claps were offered.

The Traffic Skills Course

The traffic skills course, based at a vocational institute's education building, was held on the weekend of October 19 and 20, 1985.

It was pouring rain when I arrived. In the classroom there were six students from my novice rider class, one student from another class and two new instructors. Once the head instructor finished roll call,

held a quick review of past learning, and organized a discussion on shoulder checks, signalling and formation driving, we left with the motorcycles, which had an engine capacity of 400-440 cc. The class was broken into two groups, each one with an instructor. It was intended that throughout the day we were to ride in group formation. One group consisted of four students plus an instructor, while the other had three students under the supervision of an instructor.

The heavy rain was bothersome. Luckily I borrowed a rain suit from a friend. Without it I would have had no recourse, since the course organizers made no provisions for equipment like rain gear.

The first hour on the road included slow riding manoeuvres on the parking lot, using parking lines as obstacles. While the instructor observed the events, he provided critical commentary whenever he felt it was warranted. We then practised shifting gears, stopping and starting, and making turns. After thirty minutes, the group was ready to travel on the public roadways.

The first official stop in traffic was at a nearby gas station. The motorcycles were checked for correct tire pressure. With the motorcycles ready for travel, the instructor became the formation leader as we rode through residential roads. At opportune moments, the instructor stopped the group on the side of the road and discussed strengths and weaknesses of the ride.

At the start of the ride, the instructor requested that students point out things they believed they were doing wrong. He desired feedback because he wanted to learn. Often he asked, "How are things going?" or "How did you feel about the ride?" The criticisms on student riding most often outlined by the instructor were:

1. Insufficient number and inappropriate shoulder checks.
2. Improper formation riding.
3. Keeping signal lights on when they should be shut off.
4. Improper hand signalling procedures.

Throughout the morning students took turns leading the formation. Each turn lasted for about three miles. Whenever the student leader wanted to change roles s/he would park the bike on the side of the road and a group discussion followed. The heavy rain made driving uncomfortable. It was not an enjoyable experience.

The major criticisms the instructor directed to me were the lack of proper or full-head turns (shoulder checks) and the lack of confidence with operating the motorcycle. I felt the criticisms were justified and tried to relax more. Throughout the exercises I followed my own rules of caution. For example, whenever I was the second rider in the

formation, I would not leave a stop sign at the same time as the leader. When the instructor witnessed this, and listened to my reasons he was supportive of my behavior and cautious outlook. My feelings were that the freezing rain, soaked gloves and boots, wet pants, high volume of traffic and poor visibility forced me to be extra careful, even if it meant breaking formation-riding policy.

At 12:00 noon we had lunch with the other riding group at a hamburger stop. I was soaked and filthy. Talk centred around the instructor, a young man, and two young women in the group. I felt little need to contribute to the conversation.

In the afternoon, we practised hill starts and rode on more major thoroughfares. No problems were experienced. We also stopped at a Yamaha dealer for about forty minutes. The two young women wanted to buy new gloves. While waiting for the gloves to arrive from another dealer the instructor and two women looked throughout the store for clothing items, motorcycles and accessories. I was dreaming of sitting by the fire with a hot cup of coffee.

We quit riding at 3:30 p.m. After parking the motorcycles and oiling the chains, we spent a few minutes in the classroom to briefly review the day's events and initial the informal evaluation forms. As in the first course, little discussion about the evaluation ensued. I asked the instructor as to the purpose of the evaluation forms. He was unsure but stated that he believed it was to safeguard the sponsoring organization against possible legal action. Rather than defining the benefits to the students, the instructor interpreted the evaluations as solely benefiting the organization. Based on his belief, the instructor informed me that he plays it safe with his evaluation comments.

The second day of the program began with a quick review of the major errors that students had made the previous day. The head instructor wrote the most common twelve mistakes on the blackboard. For about twenty minutes he reviewed the errors with us. Like the day before, Sunday morning was foggy and rainy. We pulled on our rain gear and pre-checked the motorcycles. My group left about 9:00 a.m. Taking turns as leaders we drove through a major street, across a bridge, and to a city park. This ride provided valuable experience in "close call" riding conditions. As the leader of the formation, I found myself in situations where I had to make a quick decision. A sudden stop at 50 km/h at an amber light facilitated intrinsic confidence.

Near the park entrance we stopped to discuss our progress. The next formation leader exceeded the speed limit by 10 km/h as she led us through the park. As number two rider, I did not speed up to close the formation. Instead I maintained the legal speed limit of 30 km/h and allowed the gap between the leader and me to increase. There was no reaction from the instructor.

From the park, we rode over a second major bridge and on major uphill arteries. At 11:25 a.m. we stopped at a restaurant. The students wanted to go for coffee. We were wet and cold. Originally, the instructor wanted to keep riding. When he recognized our hesitancy to comply, he suggested a quick coffee. This led to an extended lunch. The second group met us at the restaurant at 12:00 noon.

After lunch we left for the vocational institute to complete our formal road tests. The return trip took us over a second major bridge. At the entrance of the bridge we met another student group, which became mixed up with ours. Because of the pouring rain I could not recognize the members of my formation. I was not the only rider who was confused. Nine motorcyclists were spread all over the bridge. Once we were off the bridge, we all stopped to split into our respective groups.

Upon returning to the institute, the students were getting excited about the forthcoming test. Before the formalities commenced, the instructor guided the group through the test route, which we had to memorize for the final run. There were two examiners with cassette-mounted speakers in their helmets. They followed the students on the pre-determined course and recorded faults as they occurred.

Two students, not actively involved in the course, were also being tested. While waiting for our turns, we were beginning to freeze. My gloves were soaked. For a brief time, passing or failing the test was not as important as getting it over with. Finally, I told the instructor that I wanted to proceed with the road test. I felt very tense. After proceeding through the route, I was convinced that I had failed. In fact I mentioned this to the instructor. While the rest of the students were tested I walked to a building to dry off. I did not care to ride any more in the pouring rain and cold wind.

Other students indicated that they felt the same way. They did not want to ride any more in such devastating weather conditions. So the two instructors decided to refuel the motorcycles and to send the class to a donut shop for coffee. During this time, the testers were tallying the results back at the vocational institute. At the coffee shop, talk was almost entirely about the test.

Upon returning to the classroom, students were presented with their test results. I received a near perfect score and did not expect such a good result. There was little discussion about the marks, other than it was a good group with everyone passing. We then reviewed our student evaluations and signed the documents. I decided to stay until 5:30 p.m. to discuss my role as a participant observer with the instructors.

Section II Analysis of Observations

The Novice Rider Course

In the first part of the report an attempt was made to describe events as they impacted on an "average or typical participant." In the following text I will stand back and analyze some of the more discernable elements of the course.

The Overall Program

Throughout the course an attempt was made to uncover "the mission" of the program. I searched for statements and/or actions that reflected the values, assumptions and beliefs of the instructors. To provide a reasoned response about the program's mission, a close look at the students and instructors is required. First, the students paid a substantial fee for attending this course. They were interested. Yet they ranged widely in age, biography and interests. A conversation with students provided some of the following varied reasons for attendance:

1. I just want to use a bike for a trip in the summer.
2. My husband wanted me to ride properly. He rides all the time.
3. I'm going to Europe and want to bike there. It's easier to get a licence here.
4. I'm just interested in occasional use of a bike.
5. The only way my mom would allow me to use a bike is to take this course. She paid for it.
6. I want to get my licence. This is the best way.

Close examination of the instructors showed little embodiment of a common purpose. If one intent of the course could be extracted from instruction it would be "to pass the skills test." There was little attention

provided to confidence, frustration, individual pride, dignity, and psycho-social needs. Safe driving tended to be a secondary rule piggy-backed on skill test success. The following abbreviated examples illustrate this analysis:

1. Continuous reference by instructors to **"the test."**
2. Reference made by the instructors that their image or success rested on the number of students who passed or failed the test.
3. Focus on skills in the course that will be **tested.**
4. Preference given to three students to continue practising skills for the test, which means they miss the theory class (safety issues).

Safety was discussed. But again the stress tended to be on safety as a skill and not as a broad life view. In the theory class, the broader perspective on safety received some attention. However, safety arising from confidence was not addressed. Confidence arising from successful situational decision-making along with appropriate skills was not addressed. Throughout the course there was little evidence that a "definite" goal of safe driving was shared by all instructors. In fact, the "envelope presentation rituals" at the completion of the two courses were low key ceremonies. Rather than celebrating confident safe driving, they stressed successful physical riding skills.

The total structure of the course may be compared to the banking system of education. The instructors consider themselves as knowers, and thereby they envision the students as non-knowers. A unidirectional process of inflexible training proceeded, whereby information was deposited into the students' minds. Little experience-based discussion ensued.

Instruction

The emphasis in a rigorous skills course, like the novice motorcycle training course, is on the instructor. This became more evident as observations progressed. In particular, the instructor in the theory class tended to follow a process devoid of flexibility in organization, and a lack of sensitivity to alternative perspectives on discussion topics. On numerous occasions, issues arose which were legitimate points of view on a topic but were dismissed by the instructor. Rather than discuss relevant topics in a dignified, experience-based manner, lectures were given and low level comprehension questions were asked.

Few questions tapped into the students' experience so that advanced cognitive processes like analysis, synthesis and evaluation concerning traffic could be nurtured. The approach tended to be prescriptive (this is the way it is) rather than hermeneutic (how is it the way it is, and how may I, the instructor, and you, the student, learn from it to make us safe drivers).

Low level questions may be considered reasonable if the instructor attempts to mould them into a higher level concept. For example, a question like, "What is a car used for?" (very low level, knowledge) may lead to a question on, "How does a car relate to skidoos?" (analysis) to a question, "Are mechanized transportation systems of equal value in our society?" (evaluative). To reach the concept of mechanized transportation and society it may be prudent instructional strategy to begin at low level concepts like "use of a car." Unfortunately, there was little evidence that the instructor's use of low level cognitive questioning was the basis for higher level concept development processes.

Feedback

Educational literature consistently outlines the usefulness of feedback in the learning process. This may be in the formative (on-going) stages of a course and/or the summative stage (final stage). Direct communication between instructors and students can be productive feedback for both students and instructors.

Throughout the three days, instructors were hesitant to provide students with needed feedback. A few minutes after the informal evaluations was all the time that was provided. On the other hand, there were no opportunities for students to provide the instructors with feedback concerning their activities. There was little chance for students to relate with instructors in a meaningful way.

Grouping Individuals

As previously mentioned, a broad spectrum of self-selected students participated in the course. It is reasonable to assume that older students who are married, have professional status, and have a long history of driving in a variety of conditions have different psychological and sociological profiles than for example, students aged 16 to 19. Little attention was paid to grouping or to making use of these valuable characteristics. Older, mature students have different images of themselves, concepts of time, student conduct, concerns about driving, risk-taking elements, and styles of learning than do younger students. For them andragogy is more relevant than pedagogy.

Throughout the course there was no provision made for different student make-up. For example, on the first day of the course instructors did not review student experiences, ages, needs and expectations so that they might be joined with peers who have similar perspectives. Instructional strategy could then interface with the general group outlook. Instead, students were grouped on a random basis. For a rigorously skills-oriented course this may be a questionable educational approach; it would have been useful to group students according to compatible needs and interests. Their colleagual relationships could have been established.

Psychology of Individuals

Throughout the course little attention was given to student disappointments, frustration, confidence, apprehension and fright as they related to different features of the course. For example, if the slalom pylons were initially spread widely, students could get the feeling of successfully navigating through them. The pylons may be situated according to original students' abilities and feelings about self. After students felt successful, the pylon distance can be reduced. Such a process allows students to begin from a point of confidence (easy to complex). Yet during the course, the pylons were consistently placed in short intervals. This contributed to students starting their riding from a point of insecurity.

The older the students, the less likely they are to take risks, and the more likely they are to be cautious. Also they tend to be less confident on a new, potentially dangerous machine. They may be physically stiffer, have less co-ordination, have a lower reaction time and a higher frustration level. Such factors were not addressed in the course. Instead, manipulative skills were expected to be learned within a certain time frame; routine level of instruction and instructor-designed expectations tended to be the norm of the course. A few examples may suffice: (1) Instructors paid little attention to students whose motorcycles continuously stalled and were difficult to start. Further, they failed to consider how these events may have affected the student. (2) Instructors did not recognize that the normal revolutions of a motorcycle on a downshift are so high that the engine, unlike the operation of a car, whines loudly, producing hesitation in older riders. (3) Instructors were inattentive to beginners who were frightened to participate in certain techniques because it is much easier to hurt yourself on a motorcycle than a car.

Diagnosis of Learning Events

During the three days of riding, more emphasis was placed on the final test than on closely observing students' riding behavior and recognizing experience-based problems. The time allowed for students to talk amongst themselves and to instructors about routine difficulties was limited or non-existent. Instructors stressed an inflexible organization of activities which they considered to be the norm for expedient instruction.

Whenever problems arose they tended to be solved in the most organizationally expedient way. For example, when a problem arose with the Honda Rebel it was easier to have someone ride it, regardless of adequacy, potential danger and frustration, than to search for an alternative motorcycle. When some students had trouble kick-starting a motorcycle it was more expedient for the instructor to start it than to take the time to illustrate student errors. When students wished to discuss issues in theory class it was more expedient to discount them and instead, teach precisely according to pre-designed materials in a manner and time frame convenient for the instructor.

Use of Resources

The skills part of the course, as expected, consisted of a hands-on use of motorcycles. In the theory class the major resources were two movies, the blackboard, and a few prepared and scribbled-on overheads.

The measure of good learning resources consists of their validity to the concept (explanatory power), relevance to the student, appropriateness to an objective, motivation focus for student participation and fulfillment of an instructional method. Throughout the theory class the films were shown with little student preparation and follow-up.

The blackboard was not relevant to students since the drawings did little to portray the reality of the subject or the importance of the drawings to the issue under discussion. They failed to motivate students. The drawings made visual statements such as, "that's the way it is." They reinforced the prescriptive stance taken by the instructor.

Negotiation of Space

Throughout the course the instructors kept a noticeable space between themselves and the students. They made few attempts to get to know students so that the perceptual gap between them could be closed. They appeared to act as one group contracted to train another group. There was little negotiation of the space between the instructor and the student groups which would enhance better learning opportunities for students.

Training or Teaching

The bulk of the course was training. "How to . . ." was the leitmotif for the program. There was little use of education. For example, the following subjects were not attended to: motorcycle rider stereotyping by car drivers and the police, the changing trends in motorcycling (e.g., from chopper riding to touring), the relationship between personality and motorcycling (e.g., risk-taking and fast riding), and the everyday assumptions of driving (e.g., motorcyclists' right to squeeze between cars or to abuse roadway space). In the daily organization of the course, education-relevant ideas such as emotional commitment of students, lifestyles, challenges of the road, dialectic feedback, development of social relationships, active and passive roles in the course, flexible use of space and time, and levels of expectations were not addressed. Instead, students were taught "how to" ride a motorcycle, avoid roadway difficulties, and correct riding mistakes according to basic techniques.

The Traffic Skills Course

An attempt will now be made to review the everyday traffic skills course events from an analytic perspective.

Latent Function and Manifest Function

The function of the traffic skills course, as extrapolated from the instructor activities, appeared to be placement. That is, the course was geared towards the road test, composed of some recognized technical criteria. The students accept the criteria of testing and thereby take their rightful place in the licensed driving public.

Throughout the course the instructors did pinpoint driving features intended to promote safe driving. The instructors attempted to transmit values of safety as a manifest function of the course. But they re-interpreted this function according to its relevance to the road test. Hence the latent function of testing/evaluation success tended to predominate over the manifest function of safety.

Riding Adjustments

Throughout the two-day course, riding instruction was based entirely on formation riding. The students positioned themselves on the roads, stopped, turned and started on the basis of riding with other students.

Yet the road test demanded single riding. To do so students had to redevelop or renegotiate their previous days' riding experiences. Because the students were now single riders, everyday events as to where to ride—with parked cars on the side of a four-lane road—had to be rethought.

On the same topic, the instructors acknowledged that most of the students' riding will be single driving. Yet total practice time was given to group riding. This created a conflict between student needs, actual experiences and the sponsoring organization's measures of expedient learning.

Grouping

As in the novice rider course, students were grouped randomly. However, due to the small class involved in the second (advanced) course and the reduced number of older students (over 25 years), the groups' make-up did not have weaknesses as in the first course. (Most of the older students from the novice rider course had failed the test.)

The Road Test

From a physical testing perspective the procedures used were comprehensive. However, the context for testing allows for a few questions. Why do the instructors stress testing throughout the course? How is stress created by riding in stormy weather, by freezing while waiting for one's turn to be tested, and by becoming nervous about the testing act? Are there different procedures for different weather situations?

Obviously one cannot change test criteria for different conditions. However, there should be recognition (if in fact there is none presently) that severe weather conditions are likely to create the potential for more errors. For example, soaked, freezing novice riders with stiff fingers, crowded into bulky rain gear, are more likely to accidentally brush the signal light switch than those students who are examined in good weather. It would be useful to deal with idiosyncrasies.

CHAPTER 5
A SURVEY OF CHARACTERISTICS AND ATTITUDES OF MOTORCYCLE TRAINING COURSE TAKERS AND NON-TAKERS

P.J. Cooper
S.K.F. Fockler

Preface

A statistical description of motorcyclist characteristics reflects the everyday nature of motorcycle riding while retaining rigorous statistical procedures. Chapter 3 defined the seen-but-unnoticed features of street riding and chapter 4 described the everyday ingredients of a motorcycle rider training program. Many of these emic accounts are now redefined according to the mid-range perspective. That is, survey results are analyzed according to variables which determine the characteristics of formally trained and untrained motorcycle riders.

Introduction

In order to describe motorcyclists and the effects of their participation in motorcycle rider training, we could have set out solely to answer the question: Does motorcycle rider training produce safer riders (i.e., reduce the number of their accidents and violations)? It is conventional to assume that safe riding behavior may somehow be defined or indicated by a reduced number or no traffic crashes and violations on official records. Accident and violation records have become the major criteria for judging the performance of vehicle operators, however, our review of evaluation research literature on motorcycle rider training programs to date finds no conclusive evidence that motorcycle training reduces accidents. No causal relationship has been confirmed between motorcycle rider education and either the accident or violation rates of participants. The findings, from recent research which evaluates motorcycle training programs, suggest that any differences between the trained and untrained groups in, notably, violation rates are attributable to a number of other driver group characteristics (e.g., age, distance travelled, riding after drinking, gender, education and engine size) in addition to training status (Jonah et al., 1982).

We therefore decided to focus on defining a broad spectrum of motorcycle rider characteristics and attitudes (of which formal training participation was but one) and evaluating their relation to recorded accident and violation rates. Our initial research questions were as follows:

1. What are some general characteristics of motorcycle riders such as their demographics, riding experience, frequency and location of riding, type of motorcycle ridden, and attitudes toward safety practices?

2. What rider characteristics have a significant relationship to accident and conviction history? Is motorcycle training one of these significant characteristics?
3. Are participants of motorcycle training courses different from non-participants in terms of the above characteristics?

Each of the major sections of this chapter attempts to answer one of these basic questions about motorcycle driver characteristics. Consistent with the mid-range perspective on research and to obtain reliable and valid information about British Columbia motorcycle drivers, a telephone interview survey along with a review of official driver records was employed. This chapter describes the survey, methodology, data manipulation, and analysis of rider characteristics.

Methodology

Study Design

This study of motorcycle riders grew out of the initial concern to evaluate the effect of a motorcycle rider training program in making its participants encounter fewer subsequent traffic accidents and violations and to demonstrate improved knowledge and attitudes toward safety. A valid answer for such an evaluation question could not be found without first determining if there are already inherent pre-treatment differences between trained and untrained participants, which may account for group differences in their accident and violation records as well as their demonstrated attitudes toward safety. Therefore, the central research question became: "to what extent are motorcycle rider training program participants different from non-participants?"

Comparing the performance of graduates and non-participants according to the criteria of traffic violations and accidents, either self-reported or officially recorded, could not proceed without first checking for self-selection bias in the participant group. To compare the characteristics (e.g., demographics, driving performance, riding exposure, attitudes, etc.) of the two groups, we engaged in telephone interviews with three sampled groups of motorcycle riders; this was then followed by an analysis of the driving records of those interviewed. Multivariate analyses on the resulting data determined what variables, if any, had any effect on violations and accidents. We then compared

our three groups of motorcycle riders for any differences in these key independent variables and any other group differences apart from violations and accidents, which may contribute to whether or not they are safe drivers.

Population and Sample

The criteria for sampling were as follows:

1. Motorcycle riders were selected according to their membership in one of three groups:

   Group 1 — Those who had successfully completed a specific motorcycle training program and had passed the Motor Vehicle Department licensing exam.

   Group 2 — Those who had completed the above motorcycle training program but had failed the initial Motor Vehicle Department licensing exam at the end of the course.

   Group 3 — Those who did not attend a formal motorcycle training program but who may have had various forms of informal instruction or training.

2. Motorcycle riders were initially insured for riding in British Columbia between January 1, 1981 and December 31, 1982, and were still holding an active insurance policy in July, 1985.
3. All three groups sampled were stratified by age and gender so as to be proportionately similar in the categories of these two variables.
4. Groups 1 and 3 were expected to contain at least 300 completed interviews each, while group 2, being initially smaller, was to contain about 50 interviews.

Table 1 illustrates the number of completed telephone interviews and driver records for each group. Table 2 displays the number of completed interviews by gender. Table 3 shows the number of completed interviews by age category.

Table 1
Completed Interviews By Motorcycle Training Group

Group	No. of interviews*	Total (%)	No. of driver records[1]
1. Passed program	418	47.7	413
2. Failed program	57	6.5	54
3. No program	402	45.8	396
Total	877	100.0	863*

* 14 driver records were missing for the corresponding interviewed drivers. In total, 877 telephone interviews were completed and 863 driver records were reviewed.

Table 2
Completed Interviews By Gender

Gender	No. of interviews	Percent
Male	709	80.8
Female	168	19.2
Total	877	100.0

[1] The frequency distribution of rider training group by available driver records is minimally different by one or two cases from those training group n's reported in the succeeding Rider Training and Licensure section due to the cleaning of data for the multivariate analyses. Although a total of 863 driver records were actually reviewed, the total number of valid cases used as the total survey sample may vary slightly in succeeding analyses when cases having missing data were omitted.

Table 3
Completed Interviews By Age Category

Age group	No. of interviews	Percent
1. 16 - 19	153	17.4
2. 20 - 24	161	18.4
3. 25 - 44	438	49.9
4. 45 & over	125	14.3
Total	877	100.0

The motorcycle riders in the first two groups (table 1) were identified in co-operation with the organization that administered the motorcycle training program. They provided a list of motorcycle course registrants who took a course during 1981 or 1982 and who passed or failed the final licensing exam. A sample of the non-participants or untrained motorcyclists was generated from motor vehicle and insurance records. These three lists, totalling 13,000 names and addresses, were given to the firm which was carrying out the telephone interview survey. The contractor[1] was directed to select a random sample stratified by age and gender from each group based on response and accessibility rates. The completed interviews were then forwarded to the provincial Motor Vehicle Department to be matched with corresponding driver records. All identification of the interviewed drivers was then removed by the Motor Vehicle Department before forwarding the driver record and interview data to the researchers for coding and analysis in the Insurance Corporation of British Columbia's Traffic Safety Planning and Research Department.

[1] Campbell Farrell & Associates Research Consultants Limited.

Information Sources

Figure 2 outlines the type of data collected from telephone interviews and driver records. The telephone survey presented a broader range of data about rider characteristics than the violation, accident and licensing data that was provided by driver records.

Figure 2
Types Of Driver Information By Source

Sources	
Telephone interviews	Driver records
Demographic (e.g., age, gender, marital status, education, etc.)	Driver licence type
Reasons for taking/not taking training	Violations - Other vehicle - Motorcycle
Riding style/exposure	Accidents - Other vehicle - Motorcycle
Views on safety (e.g., helmets)	

Driver Record Coding

The corresponding official driver record for each motorcycle rider interviewed was reviewed for the licence type, and for the number and type of violations and accidents from the approximate date of licensing to November, 1985. Recorded violations and accidents were hand-checked with the original MV104 accident report to determine whether the respondent was operating a motorcycle or other vehicle at the time. Detailed MV104 data were collected only for accidents which were confirmed as motorcycle-involved incidents. The total numbers of other vehicle and motorcycle violations and accidents, since the approximate date of motorcycle licensing, were then transferred to a coding sheet. More detailed information on the date and type of motorcycle violation or other vehicle violation was also collected for the nine most recent violations.

Data Manipulation

The combined interview survey and driver record data were entered into an IBM personal computer for basic analysis using SPSS-PC +. A mainframe file in SAS was also created for more comprehensive multivariate analysis techniques. Frequencies, cross-tabulations and chi-square tests were employed to analyze driver characteristics for the entire sample as well as to compare the characteristics for each of the three training groups. This preliminary univariate process, in addition to addressing the first objective of the study, enabled us to assess how best to approach the more critical multivariate analysis that was required to deal with the study's subsequent two objectives.

As described in the preceding section, the interview samples were selected based on whether or not the subject had completed the formal motorcycle training course and then they were roughly matched based on gender and age groups. This was necessary to answer the central questions with respect to the effects of training and the differences between those who take training courses and those who do not. The overall riding population in British Columbia is more heavily weighted towards older age groups and especially male riders than is the population of those who take training courses. (Only 11% of the overall riding population are female and 20% are under 25 years of age while those who complete a recognized training course are 20% female and 37% under 25.) While the over-sampling of females and young riders made possible a more confident assessment of their contribution in explaining accidents and convictions, this factor should be borne in mind when we discuss the results with respect to characteristics of course participants as opposed to course non-participants.

In preliminary examination of the data, one of the first noticeable characteristics was the strong relationship between past accidents or violation convictions where the subjects were riding their motorcycles and those where they were driving other vehicles. The majority of subjects were licensed for passenger vehicles in addition to motorcycles. Many of the characteristics which make one a good or bad car driver may also apply to motorcycle riding.

Since driver characteristics which are correlated to violations are quite different from those driver characteristics that are correlated with accidents, the group of dependent variables was divided into two subsets: other vehicle and motorcycle violations, and other vehicle and motorcycle accidents. The research questions then became: (1) Does a significant structural relationship exist between motorcyclists' traffic violations (differentiated by whether or not they were operating a

motorcycle at the time) and a set of 34 other driver characteristics? and (2) Does a significant structural relationship exist between motorcyclists' accidents (differentiated for motorcycle/other vehicle operation) and a set of other driver characteristics?

What all this meant in terms of the subsequent analysis methodology was that the simpler multivariate models such as multiple regressions and discriminant analysis which examine the influence of a number of independent variables on one dependent variable at a time, would not be appropriate in assessing factors relating to accident or conviction involvement. Accordingly, the method chosen was to perform canonical analysis using various combinations of dependent variables. Canonical analysis (first developed by Hotelling in 1936) is a generalized form of multiple regression or, more properly, the latter is defined as a special case of the canonical. Canonical analysis (CA) is a very general analytical approach which subsumes multiple regression (MR) discriminant analysis (DA) and multivariate analysis of variance (MANOVA). The underlying process involves forming two linear combinations of variables—those on the dependent side (accidents and violations in our case) and those on the independent side. The canonical correlation is the correlation between the two linear combinations and the square of the canonical correlation (R_c^2) is an estimate of the variance shared by the two canonical variates (Pedhazur, 1982).

Canonical correlation on its own does not define the relationships between individual dependent and independent variables but, in defining the relationships between linear combinations of these variables and the contribution of each variable to that canonical variate, CA is very useful in selecting variables suitable for further analysis using MANOVA techniques. The major advantage of CA in our case was its ability to account for relations among the dependent variables of motorcycle accidents, other-vehicle accidents, motorcycle convictions and other-vehicle convictions.

As with all multivariate techniques but especially with CA, it is important to ensure that all variable distributions are approximately normal. Exact normality (a kurtosis value of less than one) is very difficult to achieve with the type of data that one collects in the field and thus, for practical reasons, we accepted a variable distribution as being approximately normal if the kurtosis value was less than 3. In most testing situations, this level ($\pm$ 3) represents the absolute maximum range for normality and will at least ensure that outliers or tails are eliminated from the distribution. Most of the independent variables in

our study met this criterion following a modest "cleaning" process to eliminate records containing extreme outliers but some variables had to be dropped from the analysis entirely due to invariance (e.g., responses related to why a training course was or was not taken and whether the motorcycle was owned or borrowed). The number of self-reported motorcycle mishaps also had a highly skewed distribution but another reason this variable was excluded was the similarity, in terms of the shape of the overall frequency distribution, with police-reported accidents. Records with missing values were also eliminated, reducing the sample size from 877 to 862.

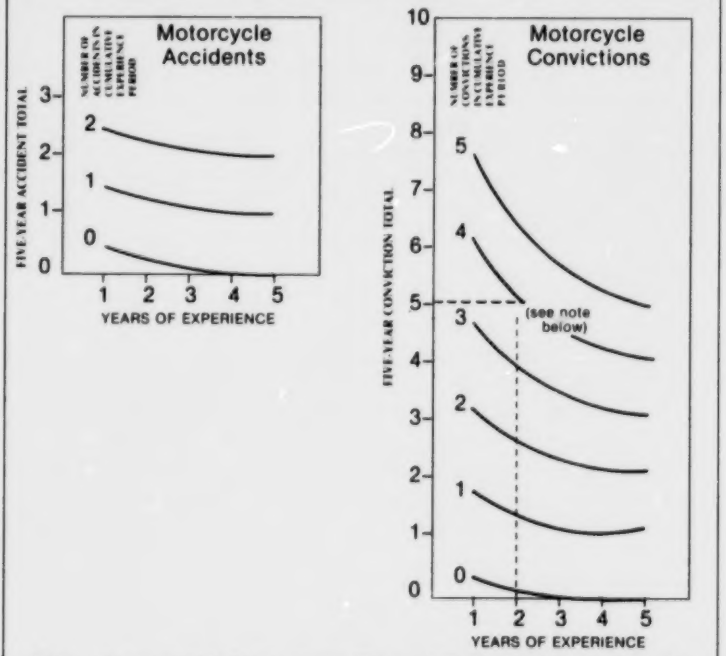
The greatest challenge came with treating the dependent variables of motorcycle convictions, motorcycle accidents, other vehicle convictions and other vehicle accidents. In order to obtain a sufficient number of trained riders for analysis purposes, two calendar years had to be considered in selecting course takers and graduates. This meant that there was a built-in differential in terms of riding experience and, therefore, the opportunity to accumulate accidents and convictions. The maximum length of "official" riding experience in British Columbia based on insurance records was just under 5 years (January, 1981 - November, 1985). However, most subjects had somewhat less experience (as little as three years for those licensed toward the end of 1982). Over 200 (238) riders had riding experience of more than 4-1/2 years ($\geq$ 55 months) and a further 419 had over 48 but less than 55 months.

The first problem was to adjust the accident and conviction totals to a constant 5-year base. The method used was to create an extract file of those riders who had close to 5 years of recorded riding history[1] and to plot their average final 5-year accident and conviction totals against their cumulative subtotals by year. The totals up to four years

[1] The adjustments in accident and conviction totals were made using the official dates of licensure and insurance without reference to the self-reported experience levels. This latter factor could then be employed as an independent variable in subsequent analyses.

were then checked using the records of riders having 4 to 4-½ years' experience. This was done for both motorcycle incidents and other vehicle incidents. The results for motorcycle incidents are shown in figure 3.

Figure 3
Five-Year Accident And Conviction Counts As A Function Of Cumulative Totals For Different Levels Of Experience



Note: An example is shown above. The most likely ultimate five-year total number of convictions for a rider who accumulated four convictions in his/her first two years of riding is five.

The application of the correction factor to accident and violation totals for riders having less than 5-years' experience also had the salutory effect of reducing the distribution skewness and kurtosis, but still not enough to approximate normality due to the significant proportion of those with no accidents. Accordingly, the accident and conviction

variables were further normalized by employing a square root transformation. These results proved acceptable in producing final kurtosis values within the limit of 3. The final, normalized data set was analyzed using the SAS CANCORR procedure.

Analysis of Rider Characteristics

Demographics

As the control group sample of motorcycle drivers surveyed in this study was stratified according to the proportion of age and gender found among the formally trained group of motorcyclists, the distribution of these major demographic variables and others related to them (e.g., marital status, level of education completed, etc.) among the total sample is more representative of trained motorcyclists than the general population of motorcycle riders. We therefore reviewed selected demographic variables of the general population of British Columbia motorcycle riders with active motorcycle insurance policies as of November 1, 1985. They served as a comparison for the demographic distribution of the study sample. These comparative distributions of the demographic characteristics of motorcycle riders in both our study sample and the general population are presented in this section.

Age

Age is known to be a variable by which formally-trained and informally-trained motorcyclists may differ, with training participants usually being older on average than non-participants (MacMillan, 1980; Jonah et al., 1982). Mortimer (1984) found there were more course participants under 19 years of age but that there was no significant difference in age between participant and non-participant groups. Age was also found to have a substantial effect on accident rates. Therefore, age appeared to be an important variable to control in this study to ensure that data cell sizes in each age category (especially ages 16 to 19) were sufficient for meaningful analysis. The formally trained and untrained groups were matched by age in the stratified sample selection process. The age distribution of the motorcyclists interviewed was shown in table 3.

In contrast to this, the distribution of rider ages in the overall British Columbia motorcycle rider population is shown in table 4 along with the survey distribution from table 3. This comparison supports Mortimer's (1984) findings.

Table 4
Comparison of Age Distribution Between Overall Population and Survey Sample

Age group	B.C. motorcycle riders (November, 1985)	Interviewed riders
16-19	2.5%	17.5%
20-24	18.2%	18.4%
25-44	62.1%	49.9%
≥ 45	17.2%	14.3%

Gender

As formally trained motorcycle riders are known to include more females than informally trained motorcyclists (MacMillan, 1980; Jonah et al, 1982; and Mortimer, 1984), gender was also considered to be an important demographic variable to control in this study to ensure adequate cell sizes by matching between trained and informally trained groups during the stratified sample selection process.

The British Columbia motorcycle rider population was found to contain only 10.5% females as compared with our sample level of 19.2%. Table 2 shows that 19.2% of the interviewed motorcyclists were females and 80.8% were males. Since the sample represents age and gender proportions found in the trained rider subset, these results are consistent with the literature.

Marital Status

Table 5 shows an approximately equal number of unmarried (49.3%) and married (50.7%) riders in the overall sample of interviewed motorcyclists. When excluding riders who are separated, divorced or widowed, there were more married motorcycle riders (50.7%) in the sample than single or never-married riders (44.1%). Since vehicle insurance in British Columbia is not permitted to discriminate on the basis of marital status (among other things), no information could be obtained from insurance records for this factor on a rider population basis.

Table 5
Marital Status Frequencies

Status	No. of interviews	Percent
Single	380	44.1
Separated	20	2.3
Divorced	18	2.1
Widowed	7	0.8
Total Unmarried	425	49.3
Married	437	50.7
Total	862	100.0
Missing = 15 records		

Education

Secondary Education Completed (Grade 12)

The majority (83%) of surveyed motorcycle drivers had completed grade 12 (see table 6). As with marital status, no motorcycle rider population data concerning education was available, but Statistics Canada census information from 1981 indicated that about 58% of the British Columbia population age 16 and over were secondary school graduates.

Table 6
Frequency of Grade 12 Graduates
Among Surveyed Motorcyclists

Response	No. of interviews*	Percent
Yes	724	83.0
No	148	17.0
Total	872	100.0
Missing = 5 records		

Post-Secondary Education Completed

Table 7 shows that slightly less than half (47.8%) of the interviewed sample of motorcyclists had completed post-secondary education. A larger proportion of motorcyclists interviewed had incomplete or no post-secondary education, but had completed secondary school. According to the Statistics Canada census data, only about 29% of the age 16+ British Columbia population in 1981 had completed college, university or a vocational institute.

Table 7
Frequency of Post-Secondary Graduates
Among Surveyed Motorcyclists

Response	No. of interviews	Percent
Yes	416	47.8
No	455	52.2
Missing	6	
Total	877	87.1

Rider Training and Licensure

Motorcycle Training

Table 8 illustrates the frequency distribution of surveyed motorcycle riders by three exclusive categories: formal training, participation and non-participation. There are no accurate data available on the percentage of the overall British Columbia motorcyclist population who have taken formal training, but estimates by the sponsors of such courses lead us to suspect a maximum figure of about 10%.

Table 8
Frequency Distribution of Motorcycle Riders by Rider Training Status

Motorcycle training group	No. of interviews*	Percent
Passed formal course	411	47.7
Failed formal course	54	6.3
No formal training	397	46.0
Total	862	100.0

* Missing = 15 records

Table 9
Frequency of Reasons for Taking a Motorcycle Training Course

Reasons	No. of interviews	Percent
To get licence	241	50.7*
To prepare for licence exam	197	41.5
To improve/learn new driving skills	394	82.9
To gain confidence	292	61.5
Other reason	223	46.9

* Percentage of the 475[1] drivers who took the motorcycle rider course. More than one response was permitted for each respondent.

Reasons for Taking Motorcycle Training

Interviewed motorcyclists who had taken formal motorcycle training were asked to give one or more reasons why they had taken it. Table 9 shows that the predominant reasons given by course participants for taking motorcycle training were "to improve skills or to learn new driving skills" (82.9%), followed by "to gain confidence" (61.5%).

[1] This total number of course participants is based on the total number of interviews as reported in table 1, before omitting those interviews with missing data as reported in table 8.

Of the other reasons given by 46.9% of interview respondents for taking the course, the most frequently mentioned were the concern for learning safety and driver survival skills (including defensive driving skills) and that the course was recommended by motorcycle dealers, friends and family. This latter reason included coercion from parents of young drivers to take the course as a precondition of being allowed to operate a motorcycle. This may partially explain the high percentage of those aged 16 to 19 in the course-taking group.

Some other reasons for taking training included: to try driving different sizes of motorcycles before purchasing one, to enrol in a reputable course, to accompany a wife or son who were also learning how to ride, to upgrade skills after a long interval of non-riding, to complete an employment-related requirement for military personnel and to satisfy job-related concerns for police officers. For a small group of riders, the course was an opportunity to have fun that was tax deductible.

Table 10
Frequency of Reasons for Not Taking a Motorcycle Training Course

Reasons	No. of interviews	Percent*
Too expensive	42	10.4
Too far away (inaccessible)	42	10.4
Inconvenient scheduling	74	18.4
Already knew how to ride	223	55.5
Not interested in any courses	95	23.6
Other reasons	190	47.3

* Percentage of the 402 drivers who did not take the motorcycle rider course. More than one response to this question was permitted for each respondent.

Reasons for Not Taking Motorcycle Training

Table 10 indicates that the majority (55.5%) of motorcyclists who did not take the motorcycle training program did not participate because they believed they already knew how to ride a motorcycle. Of the other reasons given by 47.3% for not taking the course, the most frequently mentioned were that no such course existed or was available when they first started riding or that they did not know about the course.

Some other reasons for not taking motorcycle training were: they had previous experience on a dirt bike, trail bike or scooter (under 50 cc), they were taught by other experienced riders (friends or family), they had not even considered taking a course, or they felt it was not essential to do so.

Licence Type

Table 11 indicates that 12.7% of the interviewed motorcycle drivers did not have a valid class 6 licence to operate a motorcycle in British Columbia. This unlicensed group is an unexpected finding as the study sample was selected from a list of motorcyclists with active motorcycle insurance coverage.

Table 11
Frequencies of Licensed and Unlicensed Motorcycle Riders

Licence type	Number*	%
Riders with only a class 6 licence	10	1.2
Riders with class 6 and another class	743	86.1
Riders without class 6 licence	110	12.7
Total	863	100.0

* Missing = 14 records

In comparison with provincial totals, the riders we sampled were more likely to be correctly licensed. Overall, 21.2% of insured British Columbia riders were found to be without a valid motorcycle operator's licence. Most unlicensed riders in our surveyed sample were in the untrained group; only 4% of trained riders were not properly licensed as compared to 23% in the untrained group. If these figures are representative of the two groups in the overall riding population, it would suggest a ratio of untrained to trained riders of about 10:1.

Table 11 also shows that only 1.2% of the study sample of interviewed motorcyclists had a class 6 licence alone, which means they had learned to ride a motorcycle without first being qualified to drive another vehicle, such as an automobile or truck. By contrast, the vast majority (98.8%) of these motorcyclists had first been qualified as drivers of other vehicles. The situation for the general riding population was found to be very similar. Only 1.5% of all valid motorcycle licences were class 6 (1.2% of the total population).

Licence Type by Age

Table 12 shows that there were three age groups with approximately the same proportion (14%) of unlicensed motorcycle riders, while the 25 to 44 age group had a slightly smaller proportion (11.1%). Conversely, while all age groups had over 85% with class 6 licences, it was the 25 to 44 age group which had the highest proportion (88.9%) of class 6 licensed motorcyclists. Among the drivers who were licensed only to drive motorcycles, the largest proportion (60%) were the youngest drivers (16 to 19 years) who had not yet qualified to drive other vehicles.

Table 12
Cross-Tabulation of Age
by Licence Type

Licence type*	16-19	20-24	25-44	≥ 45	Row total
Riders with only class 6	6 60.0[1] 4.0[2]	2 20.0 1.3	1 10.0 0.2	1 10.0 0.8	10 1.2
Riders with class 6 and another class	122 16.4 81.3	135 18.2 84.9	382 51.4 88.7	104 14.0 84.6	743 86.1
Riders without class 6	22 20.0 14.7	22 20.0 13.8	48 43.6 11.1	18 16.4 14.6	110 12.7
Column total	150 17.4	159 18.4	431 49.9	123 14.3	863 100.0

* Missing = 14 records [1] Row percentage [2] Column percentage

Table 13
Cross-Tabulation of Licence Type by Riding Experience

Riding experience*	Class 6 only	Class 6 & another class	No class 6	Row total
≤ 12 mo.	0	8	15	23
		34.8	65.2	2.7
		1.1	13.6	
13–24 mo.	0	40	16	56
		71.4	28.6	6.5
		5.4	14.5	
25–36 mo.	2	155	15	172
	1.2	90.1	8.7	19.9
	20.0	20.9	13.6	
37–48 mo.	5	171	12	188
	2.7	90.9	6.4	21.8
	50.0	23.0	10.9	
49–72 mo.	1	111	18	130
	0.8	85.4	13.8	15.1
	10.0	14.9	16.3	
7–10 yr.	1	85	12	98
	1.0	86.8	12.2	11.4
	10.0	11.4	10.9	
≥ 11 yr.	1	173	22	196
	0.5	88.3	11.2	22.7
	10.0	23.3	20.0	
Column total	10	743	110	863
	1.2	86.1	12.7	100.0

* Missing = 14 records

Licence Type by Riding Experience

Table 13 indicates that nearly two-thirds (65.2%) of the novice group of motorcycle riders with 12 or less months of riding experience did not have class 6 licences. Although most of the group with 13 to 24 months riding experience were properly licensed motorcyclists, they had the next highest proportion (28.6%) of unlicensed drivers. While at least 86% of the remaining more experienced groups of motorcyclists were

properly licensed, it was the most experienced group of riders (with 11 or more years experience) who made up the highest percentage (20%) of the unlicensed group. Of the 1.2% of riders licensed to operate only motorcycles, half of them were in the group with 37 to 48 months riding experience.

Licence Type by Predominant Driving Purpose

Table 14 indicates that 40% of the 110 unlicensed motorcyclists regularly ride to work or school. By comparison, 60.1% of the licensed motorcyclists ride to work/school. It was the group which does not ride to work/school that had the higher proportion (18.0%) of unlicensed riders.

Table 14
Cross-Tabulation of Riding to Work/School
By Licence Type

Licence type*	To work/school Yes	No	Row total
Class 6 only	8	2	10
	80.0	20.0	1.2
	1.6	0.5	
Class 6 & another class	444	298	742
	60.1	39.9	86.0
	89.5	81.5	
No class 6 (Unlicensed)	44	66	110
	40.0	60.0	12.8
	8.9	18.0	
Column total	496	366	862
	57.5	42.5	100.0

* Missing = 15 records

Riding Exposure

Driving exposure has been variously defined by traffic researchers in terms of distance travelled (within a specified time period), driving frequency (such as hours per day), time of day and type of driving location, all in an attempt to account for some individual driver differences in exposure to risk while driving and therefore involvement in accidents. These various measures of differential risk exposure have been used as a method of identifying high-risk driver groups and as controlled driver variables in the interpretation of accident data. The interview survey provided information about motorcyclists' riding style based on the measures of exposure described in the following tables.

Frequency distributions on these riding exposure variables are first presented followed by cross-tabulations among exposure variables, age and experience.

Table 15(a) shows that the interviewed sample of motorcycle riders was almost evenly divided into thirds with 32.0% riding one hour or less per day, 34.6% riding 1.25 to 2.5 hours per day, and 33.4% riding three or more hours per day. The mean riding frequency per day was 2.45 hours, with a slightly larger portion (34.6%) of people reporting that they rode a motorcycle between 1-¼ to 2-½ hours per day. While most operators (66.6%) rode a motorcycle less than 3 hours per day, table 15(b) also indicates that the majority (77.7%) of them rode a motorcycle between 3 and 7 days per week. The average amount of riding was 5 days per week and 36.0% of motorcyclists rode 6 to 7 days per week. Therefore, the interviewed motorcyclists were frequent daily users but with less than three hours per day riding time.

Table 15
Distribution of Motorcycle Riding Frequency During Good Weather

(a) Hours/day			(b) Days/week		
Hours	No. of interviews	Percent	Days	No. of interviews	Percent
≤ 1	277	32.0	≤ 2	193	22.3
1.25-2.50	299	34.6	3-5	362	41.7
3.00+	289	33.4	6-7	312	36.0
Total =	865	100.0	Total =	867	100.0
Missing =	12 records		Missing =	10 records	
$\bar{X}$ =	2.45 hr/day		$\bar{X}$ =	4.57 days/wk	
Mode =	2 hr/day		Mode =	7 days/wk	

Table 16
Cross-Tabulation of Age by Riding Frequency in Good Weather

Age	16-19	20-24	25-44	≥ 45	Total
Hours/day					
≤ 1	44	49	140	47	280
	15.7	17.5	50.0	16.8	32.3
	28.8	30.6	32.3	38.5	
1.25-2.5	51	62	148	38	299
	17.1	20.7	49.5	12.7	34.4
	33.3	38.8	34.2	31.1	
3.00+	58	49	145	37	289
	20.1	17.0	50.2	12.8	33.3
	37.9	30.6	33.5	30.3	
Total	153	160	433	122	868
	17.6	18.4	49.9	14.1	100.0
Missing = 9 records					
Days/week					
≤ 2	14	27	109	43	193
	7.3	14.0	56.5	22.3	22.3
	9.2	16.9	25.2	35.2	
3-5	64	59	192	47	362
	17.7	16.3	53.0	13.0	41.8
	41.8	36.9	44.4	38.5	
6-7	75	74	131	32	312
	24.0	23.7	42.0	10.3	36.0
	49.0	46.3	30.3	26.2	
Total	153	160	432	122	867
	17.6	18.5	49.8	14.1	100.0
Missing = 9 records					

Frequency of Riding by Age

Table 16 indicates that the distribution of riding frequency was somewhat related to age. The largest proportion of 16 to 19-year olds rode 3 or more hours per day (37.9%) and 6 to 7 days per week (49.0%). The largest proportions of 20 to 24-year olds rode 1-¼ to 2-½ hours per day (38.8%) and 6 to 7 days per week (46.3%). The largest proportion of 25 to 44-year olds rode 1-¼ to 2-½ hours per day (34.2%) and 3 to 5 days per week (44.4%) while drivers 45 years and older were

most likely to ride for an hour or less per day, 3 to 5 days per week. Therefore, it is apparent that the young drivers in our sample tended to ride more often than the older drivers.

Frequency of Riding by Experience

Table 17 illustrates a general pattern, with novice riders ($\leq$ 12 months) more likely to ride less frequently (fewer days per week) than the more experienced riders. By comparison, riders with over 4 years experience appeared to ride motorcycles somewhat more frequently (in terms of both hours per day and days per week) than riders having less experience.

Table 17
Cross-Tabulation of Riding Experience by Frequency of Riding

Experience	≤12 mo	13-24	25-36	37-48	49-72	73-131	≥132	Total
Hours/day								
≤ 1	9	15	63	72	42	25	54	280
	3.2	5.4	22.6	25.8	15.0	9.0	19.4	32.3
	39.1	27.3	35.8	38.3	31.6	26.0	27.4	
1.25-2.50	5	25	65	56	42	32	74	299
	1.7	8.4	21.7	18.7	14.0	10.7	24.7	34.4
	21.7	45.5	36.9	29.8	31.6	33.3	37.6	
3.00+	9	15	48	60	49	39	69	289
	3.1	5.2	16.6	20.8	16.9	13.5	23.9	33.3
	39.1	27.3	27.3	31.9	36.8	40.6	35.0	
Column total	23	55	176	188	133	96	197	868
	2.7	6.3	20.3	21.7	15.2	11.1	22.7	100.0
Missing = 9 records								
Days/week								
≤ 2	10	17	41	42	17	17	49	193
	5.2	8.8	21.2	21.8	8.8	8.8	25.4	22.3
	43.5	30.9	23.4	22.2	12.9	17.5	25.0	
3-5	10	24	79	78	54	39	78	362
	2.8	6.6	21.8	21.5	14.9	10.8	21.5	41.8
	43.5	43.6	45.1	41.3	40.9	40.2	39.8	
6-7	3	14	55	69	61	41	69	312
	1.0	4.5	17.6	22.1	19.6	13.1	22.1	36.0
	13.0	25.5	31.4	36.5	46.2	42.3	35.2	
Column total	23	55	175	189	132	97	196	867
	2.7	6.3	20.2	21.8	15.2	11.2	22.6	100.0
Missing = 10 records								

Table 18
Cross-Tabulation of Predominant Riding Purpose by Frequency of Riding in Good Weather

	Ride to work/school			Ride for pleasure		
Hours/day	Yes	No	Row total	Yes	No	Row total
≤ 1	179	100	279	261	19	280
	64.2	35.8	32.2	93.2	6.8	32.3
	35.6	27.5		31.0	76.0	
1.25-2.5	178	121	299	294	5	299
	59.5	40.5	34.5	98.3	1.7	34.4
	35.4	33.2		34.9	20.0	
3.00+	146	143	289	288	1	289
	50.5	49.5	33.3	99.7	0.3	33.3
	29.0	39.3		34.2	4.0	
Column total	503	364	867	843	25	868
	58.0	42.0	100.0	97.1	2.9	100.0
Missing = 9 records						
Days/week						
≤ 2	47	145	192	190	3	193
	24.5	75.5	22.2	98.4	1.6	22.3
	9.3	40.1		22.6	12.0	
3-5	214	148	362	347	15	362
	59.1	40.9	41.8	95.9	4.1	41.7
	42.5	40.9		41.2	60.0	
6-7	243	69	312	305	7	312
	77.9	22.1	36.0	97.8	2.2	36.0
	48.2	19.1		36.2	28.0	
Column total	504	362	866	842	25	867
	58.2	41.8	100.0	97.1	2.9	100.0
Missing = 10 records						

Frequency of Riding by Predominant Riding Purpose

Table 18 illustrates the distribution of riding frequency as related to riding purpose. Respondents who rode a motorcycle to work or school were more likely to ride fewer hours per day (between less than an hour to 2.5 hours per day) than those who rode only for pleasure but they rode more days per week, with the largest proportion (48.2%) riding 6 to 7 days per week. A higher percentage of those not riding to work/school than those riding to work/school rode 3 or more hours

per day but for days per week the situation was reversed. The high number (97.1%) of surveyed motorcyclists who rode for pleasure (which included those who also rode to work) were almost equally spread across the three categories of hours riding per day but the largest proportion (41.2%) rode from 3 to 5 days per week.

Night Riding

Table 19 illustrates that nearly all the interviewed motorcyclists (97.8%) had less than 50% of their total riding time at night, with the largest proportion (53.0%) riding between 0 and 10% of their time at night. A substantial group of riders (14.5%) reported not riding at all at night. The average amount of night riding reported by all interviewed riders was approximately 18% (17.9%) of total riding time and the mode was 10%.

Table 19
Frequency Distribution of Percentages of Night Riding

Percent of night riding	No. of interviews	Percent
0 - 10%	463	53.0
15 - 50%	391	44.8
51 - 100%	19	2.2
Total	873	100.0
Missing = 4 records		

Night Riding by Age

Table 20 illustrates the relationship between rider age and percent of time riding at night. Over 66% of younger riders 16 to 24-years old did between 15% and 50% of their riding at night and 60% of older riders (25 years and older) did 10% or less of their riding at night. Of the 19 motorcyclists reporting over 50% of their riding time at night, the largest number were in the 20 to 24-year old group.

Table 20
Cross-Tabulation of Age by Percent of Time Riding at Night

% Time night riding	Age 16-19	20-24	25-44	≥ 45	Row total
0 - 10%	47	55	264	97	463
	10.2	11.9	57.0	21.0	53.0
	30.7	34.2	60.6	78.9	
15 - 50%	102	98	167	24	391
	26.1	25.1	42.7	6.1	44.8
	66.7	60.9	38.3	19.5	
51 - 100%	4	8	5	2	19
	21.1	42.1	26.3	10.5	2.2
	2.6	5.0	1.1	1.6	
Column total	153	161	436	123	873
	17.5	18.4	49.9	14.1	100.0

Missing = 4 records

Night Riding by Self-Reported Riding Experience

Reviewing the frequency of night riding by each category of riding experience in table 21, the pattern of night riding most evident is that the largest proportion in each category of riding experience rode little or no time (0-10%) at night, except in the group of riders with 37 to 48 months riding experience in which the highest proportion (51.6%) rode between 15 and 50% of their time at night. Most of the 19 riders who reported over 50% of their riding time at night had between 3 and 10 years of experience. They were not, in other words, novice riders.

Table 21
Cross-Tabulation of Percent of Time
Riding at Night by Months Riding Experience

Riding experience	Nighttime riding 0-10%	15-50%	51-100%	Row total
≤ 12 mo.	18	5	0	23
	78.3	21.7		2.6
	3.9	1.3		
13 - 24 mo.	32	22	2	56
	57.1	39.3	3.6	6.4
	6.9	5.6	10.5	
25 - 36 mo.	99	74	2	175
	56.6	42.3	1.1	20.0
	21.4	18.9	10.5	
37 - 48 mo.	87	98	5	190
	45.8	51.6	2.6	21.8
	18.8	25.1	26.3	
49 - 72 mo.	66	62	6	134
	49.3	46.3	4.5	15.3
	14.3	15.9	31.6	
73 - 131 mo.	48	47	3	98
	49.0	48.0	3.1	11.2
	10.4	12.0	15.8	
≥ 132 mo.	113	83	1	197
	57.4	42.1	0.5	22.6
	24.4	21.2	5.3	
Column total	463	391	19	873
	53.0	44.8	2.2	100.0

Missing = 4 records

Night Riding by Driving Purpose

Table 22 indicates that the surveyed motorcyclists who rode to work or school were more likely to ride more frequently at night than those who did not ride to work or school. However, the highest percentage (53.3%) of motorcyclists who reported riding for pleasure rode infrequently (0–10%) at night.

Table 22
Cross-Tabulation of (Predominant) Riding Purpose by Percent of Time Night Riding

Night riding	To work/school			For pleasure		
	Yes	No	Row total	Yes	No	Row total
0 - 10%	214	248	462	452	11	463
	46.3	53.7	53.0	97.6	2.4	53.0
	42.4	67.6		53.3	44.0	
15 - 50%	277	114	391	377	14	391
	70.8	29.2	44.8	96.4	3.6	44.8
	54.8	31.0		44.5	56.0	
51 - 100%	14	5	19	19		19
	13.7	26.3	2.2	100.0		2.2
	2.8	1.4		2.2		
Column total	505	367	872	848	25	873
	57.9	42.1	100.0	97.1	2.9	100.0

Missing = 4 records

Predominant Riding Purpose

Table 23 shows that more than half of the interviewed motorcyclists (57.9%) reported riding motorcycles to work or school, while 42.1% rode for other reasons, most likely recreational pleasure. We can also see that nearly all surveyed motorcyclists (97.1%) rode for pleasure, suggesting the obvious conclusion that most people who ride to work or school also ride for pleasure. For virtually all the interviewed riders, the motorcycle was thus not simply a means of transport.

Table 23
Predominant Riding Purpose of Interviewed Motorcycle Riders

Riding purpose	Yes	No	Total
To work/school	507	369	876
	57.9	42.1	
For pleasure	852	25	877
	97.1	2.9	

Table 24
Cross-Tabulation of Age by Riding Purpose

Riding purpose	Age				
To work/school	16-19	20-24	25-44	≥ 45	Row total
Yes	100	113	246	48	507
	19.7	22.3	48.5	9.5	57.9
	65.4	70.2	56.3	38.4	
No	53	48	191	77	369
	14.4	13.0	51.8	20.9	42.1
	34.6	29.8	43.7	61.6	
Column total	153	161	437	125	876
	17.5	18.4	49.9	14.3	100.0
For pleasure	16-19	20-24	25-44	≥ 45	Row total
Yes	149	154	430	119	852
	17.5	18.1	50.5	14.0	97.1
	97.4	95.7	98.2	95.2	
No	4	7	8	6	25
	16.0	28.0	32.0	24.0	2.9
	2.6	4.3	1.8	4.8	
Column total	153	161	438	125	877
	17.4	18.4	49.9	14.3	100.0

Predominant Riding Purpose by Age

Table 24 shows that young people (in the 16-19 and 20-24 age groups) had the largest proportion of riders to work or school. The majority (56.3%) of 25 to 44-year olds also ride motorcycles to work or school,

whereas participation in these activities by riders 45 years old and over was down to 38.4%. Nearly all surveyed motorcyclists in all age groups reported riding for pleasure—a fairly clear indication that motorcycle riding is, for most, more than just a modal choice based on factors such as economics.

Table 25
Cross-Tabulation of Predominant Riding Purpose by Months Riding Experience

	To work/school			For pleasure		
Experience	Yes	No	Row total	Yes	No	Row total
≤ 12 mo.	6	17	23	22	1	23
	26.1	73.9	2.6	95.7	4.3	2.6
	1.2	4.6		2.6	4.0	
13 - 24 mo.	29	27	56	52	4	56
	51.8	48.2	6.4	92.9	7.1	6.4
	5.7	7.3		6.1	16.0	
25 - 36 mo.	99	76	175	172	4	176
	56.6	43.4	20.0	97.7	2.3	20.1
	19.5	20.6		20.2	16.0	
37 - 48 mo.	121	70	191	186	5	191
	63.4	36.6	21.8	97.4	2.6	21.8
	23.9	19.0		21.8	20.0	
49 - 72 mo.	86	49	135	130	5	135
	63.7	36.3	15.4	96.3	3.7	15.4
	17.0	13.3		15.3	20.0	
73 - 131 mo.	58	40	98	97	1	98
	59.2	40.8	11.2	99.0	1.0	11.2
	11.4	10.8		11.4	4.0	
≥ 132 mo.	108	90	198	193	5	198
	54.5	45.5	22.6	97.5	2.5	22.6
	21.3	24.4		22.7	20.0	
Column total	507	369	876	852	25	877
	57.9	42.1	100.0	97.1	2.9	100.0

Missing = 1 record

Riding Purpose by Self-Reported Riding Experience

Table 25 shows that, except for novice riders with a year or less of experience, the largest proportion of riders at all levels of riding experience rode to work or school. The highest proportions occurred for motorcyclists with between 3 and 6 years of riding experience. If the majority of novice riders (≤ 12 months experience) are 16 and 17

years old, the low proportion of riding to work/school probably reflects the small number having full-time jobs and also the close proximity of secondary schools as compared to a university which may be many kilometres away from where most students live.

Location of Most Riding

From table 26, we see that the majority (61.1%) of the interviewed motorcyclists rode most of the time in town or city locations, while only half as many (32.6%) rode predominantly on highways. A small group (6.3%) of interviewees rode motorcycles mostly in off-road situations. Thus, we are discussing a motorcyclist population who are for the most part urban riders.

Table 26
Location of Most Riding

Location	No. of interviews	Percent
In town/city	534	61.1
On highway	285	32.6
Off road	55	6.3
Total	874	100.0
Missing = 3 records		

Location of Most Riding by Age

Table 27 illustrates a possible relationship between age and the location of most riding. The majority of riders in all age groups rode in towns or cities but younger motorcyclists rode more in urban locations than older drivers. Of the 16 to 19-year olds, 74.5% rode predominantly in towns or cities while only 45.6% of the 45 and older group were urban riders. Conversely, there were more older motorcyclists who rode on the highway (40.8% of over 45-year olds and 37.6% of 25 to 44-year olds) than young motorcyclists (19.6% of 16 to 19-year olds, and 24.8% of 20 to 24-year olds).

Table 27
Cross-Tabulation of Age by
Location of Most Riding

	Age				
Location	16-19	20-24	25-44	≥ 45	Row total
In town/city	114	113	250	57	534
	21.3	21.2	46.8	10.7	61.0
	74.5	70.2	57.3	45.6	
On highway	30	40	164	51	285
	10.5	14.0	57.5	17.9	32.6
	19.6	24.8	37.6	40.8	
Off road	9	7	22	17	55
	16.4	12.7	40.0	30.9	6.3
	5.9	4.3	5.0	13.6	
All of above		1			1
		100.0			0.1
		0.6			
Column total	153	161	436	125	875
	17.5	18.4	49.8	14.3	100.0
Missing = 2 records					

Location of Most Riding by Riding Experience

Although table 28 indicates that the majority of motorcyclists at all levels of experience most often rode in towns or cities, it is evident that novice riders with 2-years experience or less are the most predominantly urban riders (78.3% of riders with 12 months or less experience and

71.4% of riders with 13 to 24 months experience most often rode in towns or cities). By contrast, the more experienced motorcyclists (those with over two years of experience) were more likely to report riding predominantly on highway locations. It was also the most experienced motorcyclists (with 11 or more years experience) who made up more than twice as many (38.2%) of the off-road riders than any other level of experience.

Table 28
Cross-Tabulation of Location of Most Riding by Months Riding Experience

Experience	In town/city	On highway	Off road	All	Row total
≤ 12 mo.	18	3	2		23
	78.3	13.0	8.7		2.6
	3.4	1.1	3.6		
13 - 24 mo.	40	12	4		56
	71.4	21.4	7.1		6.4
	7.5	4.2	7.3		
25 - 36 mo.	112	58	6		176
	63.6	33.0	3.4		20.1
	21.0	20.4	10.9		
37 - 48 mo.	112	71	8		191
	58.6	37.2	4.2		21.8
	21.0	24.9	14.5		
49 - 72 mo.	91	40	4		135
	67.4	29.6	3.0		15.4
	17.0	14.0	7.3		
73 - 131 mo.	60	28	10		98
	61.2	28.6	10.2		11.2
	11.2	9.8	18.2		
≥ 132 mo.	101	73	21	1	196
	51.5	37.2	10.7	0.5	22.4
	18.9	25.6	38.2	100.0	
Column total	534	285	55	1	875
	61.0	32.6	6.3	0.1	100.0

Missing = 2 records

Location of Most Riding Done by Riding Purpose

Table 29 illustrates a rather obvious relationship between location of most riding done and purpose of riding. The majority (65.7%) of motorcyclists who rode in urban locations also rode to work or school, while almost all of those, who rode primarily off-road, rode for pleasure. Overall, the motorcyclists who rode mainly in urban locations made up the largest proportion of each group by riding purposes.

Table 29
Cross-Tabulation of Predominant Riding Purpose by Location of Most Riding

Location	To work/school			For pleasure		
	Yes	No	Row total	Yes	No	Row total
In town/city	350	183	533	515	19	534
	65.7	34.3	61.0	96.4	3.6	61.0
	69.2	49.7		60.6	76.0	
On highway	146	139	285	281	4	285
	51.2	48.8	32.6	98.6	1.4	32.6
	28.9	37.8		33.1	16.0	
Off road	9	46	55	53	2	55
	16.4	83.6	6.4	96.4	3.6	6.4
	1.8	12.5		6.2	8.0	
All above	1			1		
	100.0			100.0		
	0.2			0.1		
Column total	506	368	874	850	25	875
	57.9	42.1	100.0	97.1	2.9	100.0
	Missing = 3 records			Missing = 2 records		

Engine Size

Table 30 shows that the largest proportion (44.5%) of the interviewed riders operated motorcycles with engine sizes between 401 and 750 cc. The large difference between the mode engine size (400 cc) and the mean engine size (602 cc) can be accounted for by the fact that the most popular engine sizes in the overall frequency distribution were 400 cc and 750 cc. The distribution was, in fact, bimodal.

In the British Columbia motorcyclist population generally, 38.2% rode vehicles of 400 cc or less (as compared to 35.9% in our sample) and 20.2% operated vehicles greater than 750 cc (as compared to 19.6%). The two most popular sizes by far were 400 and 750 cc but with the latter predominating.

Table 30
Interviewed Motorcycle Riders by
Engine Size of Motorcycle Most Often Ridden

Engine size	No. of interviews	Percent
≤ 100 cc	38	4.3
101 - 400 cc	276	31.6
401 - 750 cc	389	44.5
751 - 1150 cc	122	14.0
≥ 1151 cc	49	5.6
Total	874	100.0
Mean: 602.1 cc	Mode: 400 cc*	Median: 550.0
Missing = 3 records		
* The distribution was bimodal: 400 cc, N = 156; 750 cc, N = 147		

Engine Size by Age

Table 31 shows that the largest proportions of the 16–19, 20–24 and 25–44 age groups rode motorcycles in the mid-range of 401 to 750 cc, while riders in the 45 and over age group were almost evenly distributed between small motorcycles of 101 to 400 cc (35.2%) and medium range sizes of 401 to 750 cc (33.6%). Large motorcycles (≥ 1151 cc) were relatively unpopular with both the very young and the very old.

Table 31
Cross-Tabulation of Age by Engine Size of Motorcycle Most Frequently Ridden

	Age				
Engine size	16-19	20-24	25-44	≥ 45	Row total
≤ 100 cc	3	8	16	11	38
	7.9	21.1	42.1	28.9	4.3
	2.0	5.0	3.7	8.8	
101 - 400 cc	55	43	134	44	276
	19.9	15.6	48.6	15.9	31.5
	35.9	26.7	30.6	35.2	
401 - 750 cc	77	77	193	42	389
	19.8	19.8	49.6	10.8	44.4
	50.3	47.8	44.1	33.6	
751 - 1150 cc	14	20	70	18	122
	11.5	16.4	57.4	14.8	13.9
	9.2	12.4	16.0	14.4	
≥ 1151 cc	4	13	25	10	52
	7.7	25.0	48.1	19.2	5.9
	2.6	8.1	5.7	8.0	
Column total	153	161	438	125	877
	17.4	18.4	49.9	14.3	100.0

Engine Size by Riding Experience

Table 32 suggests a positive relationship between motorcycle engine size and length of riding experience, with more novice riders choosing smaller vehicles of 400 cc or less and the most experienced riders choosing larger, more powerful vehicles (401–750 cc).

The largest proportion of riders at each level of experience over two years rode motorcycles with medium size engines in the 401 to 750 cc range. By far the greatest proportion (31.6%) of the largest engine size category (over 750 cc) was reported by experienced riders with 11 or more years of riding.

Table 32
Cross-Tabulation of Engine Size by Months Riding Experience

Experience	≤ 400 cc	401-750 cc	≥ 751 cc	Row total
≤ 12 mo.	12	8	2	22
	54.5	36.4	9.1	2.5
	3.8	2.1	1.2	
13 - 24 mo.	30	21	5	56
	53.6	37.5	8.9	6.4
	9.6	5.4	2.9	
25 - 36 mo.	72	80	24	176
	40.9	45.5	13.6	20.1
	22.9	20.6	14.0	
37 - 48 mo.	69	89	33	191
	36.1	46.6	17.3	21.9
	22.0	22.9	19.3	
49 - 72 mo.	44	65	26	135
	32.6	48.1	19.3	15.4
	14.0	16.7	15.2	
73 - 131 mo.	31	39	27	97
	32.0	40.2	27.8	11.1
	9.9	10.0	15.8	
≥ 132 mo.	56	87	54	197
	28.4	44.2	27.4	22.5
	17.8	22.4	31.6	
Column total	314	389	171	874
	35.9	44.5	19.6	100.0

Missing = 3 records

Engine Size by Riding Purpose

Table 33 shows that the major proportion (49.0%) of the surveyed motorcyclists who rode to work or school operated motorcycles with medium size engines (401-750 cc). The greatest proportion of vehicles not used for pleasure riding were in the small (400 cc or less) category.

Table 33
Cross-Tabulation of Predominant Riding Purpose by Motorcycle Engine Size

Engine size	To work/school			For pleasure		
	Yes	No	Row total	Yes	No	Row total
≤ 400 cc	161	152	313	299	15	314
	51.4	48.6	35.8	95.2	4.8	35.9
	31.8	41.4		35.2	60.0	
401 - 750 cc	248	141	389	384	5	389
	63.7	36.2	44.6	98.7	1.3	44.5
	49.0	38.4		45.2	20.0	
≥ 751 cc	97	74	171	166	5	171
	56.7	43.3	19.6	97.1	2.9	19.6
	19.2	20.2		19.6	20.0	
Column total	506	367	873	849	25	874
	58.0	42.0	100.0	97.1	2.9	100.0
	Missing = 4 records			Missing = 3 records		

Ownership of Motorcycle Most Often Ridden

Table 34 shows that the vast majority (95.9%) of interviewed motorcyclists most often rode their own motorcycle. The largest proportion (30.6%) of borrowed motorcycles were ridden by the youngest operators (16 to 19-years old), while riders in the 25 to 44-year old group were most likely (at 97.7%) to own the motorcycles they were riding.

Table 34
Cross-Tabulation of Age
by Motorcycle Ownership

Motorcycle most often ridden	Age 16-19	20-24	25-44	≥ 45	Row total
Own	142	152	428	119	841
	16.9	18.1	50.9	14.1	95.9
	92.8	94.4	97.7	95.2	
Borrowed	11	9	10	6	36
	30.6	25.0	27.8	16.7	4.1
	7.2	5.6	2.3	4.8	
Column total	153	161	438	125	877
	17.4	18.4	49.9	14.3	100.0

Ownership of Motorcycle Most Often Ridden by Riding Purpose

Table 35 indicates that the majority (55.6%) of borrowed motorcycles were ridden by those who did not ride to work or school. Borrowed motorcycles were almost invariably used for pleasure riding.

Table 35
Cross-Tabulation of Riding Purpose
By Ownership of Motorcycle Most Often Ridden

Motorcycle	To work/school Yes	No	Row total	For pleasure Yes	No	Row total
Own	491	349	840	818	23	841
	58.5	41.5	95.9	97.3	2.7	95.9
	96.8	94.6		96.0	92.0	
Borrowed	16	20	36	34	2	36
	44.4	55.6	4.1	94.4	5.6	4.1
	3.2	5.4		4.0	8.0	
Column total	507	369	876	852	25	877
	57.9	42.1	100.0	97.1	2.9	

Missing = 1 record

Age-Related Differences in Untrained Riders

Since only an estimated 10% or so of British Columbia motorcyclists have taken formal motorcycle training, our sample of 862 interviewed riders—containing about 50% trained operators—was certainly not representative. The proportions of young riders and females in the stratified sample were, likewise, more representative of trained than untrained riders.

Tables 36 and 37 contain means or percentages for all variables from the questionnaires and driving records, broken down by age group within the training category. Tables 38 and 39 give the breakdown for past accident and violation (conviction) details. A number of differences may be seen between trained and untrained riders especially in the areas of riding exposure (time and frequency), the use of proper clothing/protective equipment, and the mean number of accident/conviction involvements. All of these variables will be examined later when we discuss the multivariate analysis process. Because the "failed training" group was very similar in almost all responses to the "successful" trained group and because its size was so small, these two groups have been combined in tables 36, 38 and 39. The number of motorcycle and other vehicle accidents in the "failed" group were too small (at 7 and 11, respectively) to compare with other groups on a rate basis but conviction rates (0.72 and 1.38) were close to those for the successfully trained group (0.84 and 1.36).

For now, we can restrict our consideration to the subset of data (table 37) consisting of those with no formal training background (referred to for simplicity's sake as untrained) as the group more closely related to the overall population. The age/gender distributions deviate somewhat from the general riding population but, since the gender split (16% female compared to 11% throughout British Columbia is not too greatly different, we can at least examine the variations in response by age group. The sample sizes by age group ranged from 50 to 198.

There was a steady decrease in the proportion of those reporting riding to work or school under all weather conditions as age increased. This may be in part due to restricted alternate-vehicle options for the youngest age group and also may reflect less tolerance for discomfort or more concern for appearance with older, perhaps more conservative riders. Overall, only 10% said they rode to work/school no matter what the conditions.

Large motorcycles were not a characteristic of the very young but were most prevalent in the 20-24 age group of untrained riders. The proportion of 750 cc + motorcycles decreased thereafter until by the 45 + age group, smaller vehicles ($\leq$ 400 cc) predominated. Presumably, factors related to cost and to lack of confidence account for the lower proportion of large motorcycles in the novice group. The contrasting steady increase in large motorcycles with age, all the way through 45 + years, is worth noting in the formally trained group.

There was a small but consistent decrease with advancing age in the proportion of untrained riders who agreed that only properly tested (certified) helmets should be worn. There was also a tendency for riders to disagree less with the idea that helmets restrict sensory perception as age increased. Likewise, the higher the age group the more likely were the respondents to agree that helmets were overrated insofar as providing adequate protection in a collision; and the less likely were they to agree that the new helmet models provided both comfort and safety. Acceptance of helmet wearing seemed, therefore, to be more a characteristic of the relatively new (young) riders and found less favor with older, more experienced riders.

The area of riding experience also requires some explanation since, theoretically, most if not all the respondents should have had no more than 60 months of official riding. The experience variable from the questionnaire represents self-reported experience as opposed to the recorded length of time a British Columbia motorcycle (vehicle) licence/insurance policy had been held. It would appear that a substantial proportion of the respondents had obtained many months (and even years) of riding experience prior to licensure. The fact that 23% of the untrained respondents still did not hold a valid motorcycle operator's licence lends further credence to this hypothesis. In addition, some older riders could well have been licensed previously in provinces other than British Columbia—the records would not show this.

In terms of riding exposure, the number of days per week riding and the percent of riding done at night both tended to decrease with increasing age. The former phenomenon relates to the "ride to work/school" factor. The latter characteristic of nighttime riding may well relate to the greater involvement of youth in party activities and peer group associations. There was also a marked tendency for the proportion of operators riding principally on highways or off-road to increase with age group. Young riders were predominantly urban riders.

The variables related to motorcycle and other-vehicle incidents will be described in more detail later in this chapter, but one area deserves mention at this time since it will not be utilized in subsequent analyses. This is the variable representing self-reported motorcycle mishaps (i.e., all accidents including minor, undocumented spills, etc.) since 1981. The average number for those in their first few years of riding (ages 16-19) was dramatically higher than those for all other age groups. This difference seems consistent with a trial-and-error learning process especially since the trained riders had a lower average. Unfortunately, the high sample standard deviation and kurtosis made this variable distribution extremely nonnormative and a poor candidate for multivariate analysis.

Very little may be said concerning the distribution of violation types and accident characteristics. Moving infractions (more often minor than major in nature) dominated the convictions, and intersection crashes dominated the accident types. Off-road excursions seemed more characteristic of younger than older age groups. As expected, a high proportion (70% over all age groups) of recorded accidents involved injury to the rider.

It is worth noting that major behavioral offences (mainly alcohol-related) were more prevalent on the records of untrained riders than on those of course-takers. Less than 2% (1.5%) of convictions on the records of trained riders were for major behavioral offences as compared to 3.7% for those of untrained motorcyclists. This difference was significant in an X^2 test at $p < .05$.

Table 36
Age Group of Formally Trained Riders By Percent or Average Value of Variable Category

	16-19	20-24	25-44	≥ 45	All
Gender					
Male	88.2	74.1	71.9	92.3	78.1
Female	11.8	25.9	28.1	7.7	21.9
Riding to/from work/school					
No	26.4	25.3	39.4	57.7	36.7
Good weather only	55.5	60.0	49.5	38.5	51.2
All weather	18.1	14.7	11.1	3.8	12.1
Riding for pleasure					
Yes	97.4	97.5	97.7	93.8	97.1
No	2.6	2.5	2.3	6.2	2.9
Location of most riding					
Town/city	69.6	65.1	54.6	47.9	57.9
Highway	25.3	33.7	42.9	50.7	39.6
Off-road	5.1	1.2	2.5	1.4	2.5
Motorcycle ridden					
Own	89.5	91.4	97.7	93.8	94.6
Borrowed	10.5	8.6	2.3	6.2	5.4
Engine size category					
≤ 400 cc	38.2	30.9	33.5	36.9	34.3
401-750 cc	51.3	54.3	47.1	35.4	47.4
≥ 751 cc	10.5	14.8	19.4	27.7	18.3
Bright colored or fluorescent clothing					
Yes	64.5	66.7	72.9	78.5	71.1
No	35.5	33.3	27.1	21.5	28.9
Special protective clothing					
Yes	84.2	91.4	90.0	83.1	88.3
No	15.8	8.6	10.0	16.9	11.7

Table 36 (Cont'd)
Age Group of Formally Trained Riders By Percent or Average Value of Variable Category

	16-19	20-24	25-44	≥ 45	All
Grade 12 completed					
Yes	94.7	86.4	86.4	71.4	85.9
No	5.3	13.6	13.6	28.6	14.1
Post-secondary completed					
Yes	26.3	50.0	64.3	50.0	53.3
No	73.7	50.0	35.7	50.0	46.7
Marital status					
Single	90.8	83.8	25.9	14.1	46.1
Married	9.2	6.2	65.7	82.8	49.3
Separated	-	-	3.2	-	1.6
Divorced	-	-	4.2	-	2.1
Widowed	-	-	1.0	3.1	0.9
Should only wear tested helmets					
Agree	94.7	90.0	92.3	81.3	90.7
Disagree	1.4	6.3	5.9	12.5	6.1
Depends	3.9	3.7	1.8	6.2	3.2
Helmets restrict sight/sound					
Agree	21.3	37.0	29.9	29.2	29.6
Disagree	69.3	43.2	52.5	52.3	53.6
Depends	9.4	19.8	17.6	18.5	16.8
Protection of helmets overrated					
Agree	11.1	16.0	14.0	16.1	14.2
Disagree	88.9	77.8	79.1	79.0	80.5
Depends	-	6.2	6.0	3.2	4.7
Don't know	-	-	0.9	1.7	0.6

Table 36 (Cont'd)
Age Group of Formally Trained Riders By Percent or Average Value of Variable Category

	16-19	20-24	25-44	≥ 45	All
New helmets comfortable and safe					
Agree	91.8	91.9	83.6	80.3	86.1
Disagree	4.1	-	6.8	4.9	4.8
Depends	4.1	8.1	9.2	13.1	8.7
Don't know	-	-	0.4	1.7	0.4
Driver licence					
Licensed	98.6	94.9	95.9	96.8	96.1
Not licensed	1.4	5.1	4.1	3.2	3.9
Riding experience (mo.)					
Mean	50.1	46.3	61.2	74.8	58.6
Riding hours/day					
Mean	2.26	2.41	2.39	2.72	2.41
Riding days/week					
Mean	5.53	4.94	4.20	4.11	4.55
% Nighttime riding					
Mean	23.7	24.4	16.2	10.7	18.2
No. of motorcycle accidents since 1981 (self-reported)					
Mean	1.47	0.87	0.46	0.28	0.68
No. of other vehicle violations					
Mean	2.21	1.68	1.07	0.98	1.36
No. of motorcycle violations					
Mean	2.31	1.00	0.43	0.33	0.84

Table 36 (Cont'd)
Age Group of Formally Trained Riders By Percent or Average Value of Variable Category

	16-19	20-24	25-44	≥ 45	All
Total no. of all accidents					
Mean	0.64	0.65	0.25	0.13	0.37
No. of other-vehicle accidents					
Mean	0.41	0.42	0.16	0.10	0.24
No. of motorcycle accidents					
Mean	0.23	0.23	0.09	0.03	0.13

Table 37
Age Group of Untrained Riders By Percent Or Average Value of Variable Category

	16-19	20-24	25-44	≥ 45	All
Gender					
Male	87.0	80.5	80.3	96.0	83.7
Female	12.3	19.5	19.7	4.0	16.3
Riding to/from work/school					
No	41.1	33.8	49.2	64.0	46.5
Good weather only	43.8	51.3	42.6	32.0	43.3
All weather	15.1	14.9	8.2	4.0	10.2
Riding for pleasure					
Yes	97.3	93.5	99.0	96.0	97.2
No	2.7	6.5	1.0	4.0	2.8
Location of most riding					
Town/city	79.7	76.6	60.7	42.3	64.9
Highway	13.5	15.6	31.1	26.9	24.3
Off-road	6.8	7.8	8.2	30.8	10.8

Table 37 (Cont'd)
Age Group of Untrained Riders By Percent Or Average Value of Variable Category

	16-19	20-24	25-44	≥ 45	All
Motorcycle ridden					
Own	95.9	97.4	98.5	98.0	97.7
Borrowed	4.1	2.6	1.5	2.0	2.3
Engine size category					
≤ 400 cc	38.9	31.2	37.1	55.1	38.5
401-750 cc	48.6	41.6	41.1	28.6	41.0
≥ 751 cc	12.5	27.2	21.8	16.3	20.5
Bright colored or fluorescent clothing					
Yes	37.0	29.9	33.8	44.0	34.9
No	63.0	70.1	66.2	56.0	65.1
Special protective clothing					
Yes	72.6	79.2	76.3	54.0	73.4
No	27.4	20.8	23.7	46.0	26.6
Grade 12 completed					
Yes	83.6	89.6	81.6	54.0	80.1
No	16.4	10.4	18.4	46.0	19.9
Post-secondary completed					
Yes	26.0	43.4	49.2	30.0	41.4
No	74.0	56.6	50.8	70.0	58.6
Marital status					
Single	90.4	71.4	22.4	8.3	43.1
Married	9.6	24.7	69.3	83.3	51.0
Separated	-	1.3	3.6	6.3	2.8
Divorced	-	2.6	3.1	2.1	2.3
Widowed	-	-	1.6	-	0.8

Table 37 (Cont'd)
Age Group of Untrained Riders By Percent
Or Average Value of Variable Category

	16-19	20-24	25-44	≥ 45	All
Should only wear tested helmets					
Agree	91.8	87.0	84.2	81.6	85.8
Disagree	6.8	13.0	11.2	12.2	10.9
Depends	1.4	-	4.6	6.2	3.3
Helmets restrict sight/sound					
Agree	42.5	41.6	44.2	57.1	44.9
Disagree	54.8	44.2	43.7	34.7	44.7
Depends	2.7	14.2	12.1	8.2	10.4
Protection of helmets overrated					
Agree	26.0	26.7	29.5	39.6	29.6
Disagree	69.9	69.3	65.8	58.3	66.3
Depends	4.1	4.0	4.1	2.1	3.9
Don't Know	-	-	0.6	-	0.2
New helmets comfortable and safe					
Agree	92.8	77.5	78.0	72.5	80.1
Disagree	2.9	14.1	11.0	17.5	10.8
Depends	4.3	8.4	6.0	10.0	6.6
Don't know	-	-	5.0	-	2.5
Driver licence					
Licensed	72.6	76.6	79.9	72.0	76.9
Not licensed	27.4	23.4	20.1	28.0	23.1
Riding experience (mo.)					
Mean	69.2	95.9	147.7	192.9	128.6
Riding hours/day					
Mean	2.65	2.51	2.46	2.08	2.46

Table 37 (Cont'd)
Age Group of Untrained Riders By Percent Or Average Value of Variable Category

	16-19	20-24	25-44	≥ 45	All
Riding days/week					
Mean	5.12	4.96	4.52	3.76	4.62
% Nighttime riding					
Mean	24.4	25.0	14.6	8.5	17.6
No. of motorcycle accidents since 1981 (self-reported)					
Mean	2.47	0.53	0.57	0.14	0.86
No. of other vehicle violations					
Mean	4.14	2.75	1.90	0.94	2.36
No. of motorcycle violations					
Mean	2.26	1.78	0.78	0.06	1.16
Total no. of all accidents					
Mean	0.95	0.73	0.46	0.24	0.58
No. of other vehicle accidents					
Mean	0.72	0.52	0.36	0.22	0.44
No. of motorcycle accidents					
Mean	0.22	0.21	0.10	0.02	0.13

Table 38
Training and Age Group By Percent of Conviction Types

Type	Took formal training				No formal training			
	16-19	20-24	25-44	45+	16-19	20-24	25-44	≥ 45
Motorcycle conviction (percent)								
Major adm/lic	3	1	1	10	15	13	9	-
Minor opertnl	6	3	3	14	6	13	9	-
Major opertnl	1	1	1	5	6	2	3	-
Minor moving	73	67	71	61	57	54	53	100
Major moving	17	26	24	10	19	16	22	-
Minor behavrl	-	1	-	-	1	1	-	-
Major behavrl	-	1	-	-	1	1	4	-
Total (N)	170	77	92	21	156	134	151	3
Other-vehicle conviction (percent)								
Major adm/lic	3	1	-	2	3	5	2	-
Minor opertnl	12	4	3	3	8	8	6	2
Major opertnl	5	4	8	15	10	8	7	5
Minor mainten.	-	1	-	-	1	1	1	-
Minor moving	57	67	66	49	55	54	57	53
Major moving	21	22	20	26	19	16	23	40
Minor behavrl	1	-	-	-	-	1	-	-
Major behavrl	1	1	3	5	4	7	4	-
Total (N)	154	132	231	61	276	200	358	45

Table 39
Training and Age Group By Percent of Accident Types

Type	Took formal training				No formal training			
Motorcycle	16-19	20-24	25-44	≥ 45	16-19	20-24	25-44	≥ 45
Accident type (percent)								
Rear end	6	6	25	50	6	19	20	-
Head on	-	-	-	-	6	-	-	-
Side swipe	-	6	-	-	-	-	-	-
90° intersection	6	43	20	-	32	25	20	-
Overtaking	6	-	5	-	-	6	15	-
L. trn near side	-	-	5	-	6	-	-	-
L. trn far side	6	6	-	-	6	-	-	100
L. trn opposing	23	6	10	-	-	31	20	-
Off-rd right	18	6	-	-	13	-	5	-
Off-rd left	6	-	-	-	-	6	-	-
One-way street	-	6	-	-	-	-	-	-
Parking lot	6	-	-	-	-	-	-	-
Unknown	23	21	35	50	31	13	20	-
Casualty								
Yes	65	61	90	100	63	75	70	100
No	35	39	10	-	37	25	30	-
Total (N)	17	18	20	2	16	26	20	1

Missing=3 records Missing=5 records

The "Average" British Columbia Motorcycle Rider

In an attempt to create a profile of the "average" British Columbia motorcyclist, an extract file of the survey database was created to match the overall motorcycle rider population distribution in terms of gender, age category and training. The file was created through random selection of records using the SPSS SAMPLE routine. The final stratified sample contained 89% males and 10% formally-trained riders. There were 4% riders under 20 years, 18% between 20 and 24 years, 60% between 25 and 44, and 18% over 44 years of age. The proportions of gender and training category were matched with the population within each separate age group.

The result was a file of 142 rider records which could be used to produce a mean or modal response to each of the attitudinal and behavioral questions on the survey.

The typical motorcycle rider is male, between the ages of 25 and 44 and has completed high school but not college. He has taken no formal training because at the time of licence application, he felt competent as a motorcycle operator. The typical rider has been riding a motorcycle in some form for about twelve years even though part of this time may have been unlicensed. He rides, on average, just over 2-½ hours per day and between 4 and 5 days per week—in other words, a substantial amount. Ten percent or less of this riding is done at night.

The "average" rider travels regularly to/from work or school on his motorcycle but almost invariably utilizes alternate transportation methods when the weather is inclement. He also uses his motorcycle for pleasure trips. He rides either a 400 cc or a 750 cc motorcycle which is owned and properly licensed, and the majority of the trips are within the city environment. He takes care to outfit himself in some form of protective clothing but is not particularly concerned with wearing bright colors to enhance his conspicuity.

The typical rider thinks that only strictly tested helmets should be worn and that new helmet designs are comfortable. Likewise, he does not feel that helmets restrict his vision or hearing and disagrees with any suggestion that the protection afforded by helmets is overrated. He does not recall ever having had an accident—even a minor, non-reportable one.

THE "TYPICAL" B.C. MOTORCYCLIST

- 25 - 44 YEAR - OLD MALE
- HIGH SCHOOL GRADUATE
- NO FORMAL MOTORCYCLE TRAINING
- 12 YEARS RIDING EXPERIENCE (SOME PRIOR TO LICENSURE)

- WEARS PROTECTIVE CLOTHING
- THINKS HELMETS ARE COMFORTABLE AND DO NOT RESTRICT VISION OR HEARING
- DOES NOT FEEL PROTECTION AFFORDED BY HELMETS IS OVERRATED
- IS NOT PARTICULARLY CONCERNED WITH CONSPICUITY

- RIDES A (400 - 750 c c) MOTORCYCLE WHICH HE OWNS AND FOR WHICH HE IS PROPERLY LICENSED
- DOES NOT RECALL EVER HAVING EVEN A MINOR, NON-REPORTABLE MISHAP

- RIDES OVER 2½ HRS. PER DAY, 4 — 5 DAYS PER WEEK
- RIDES TO WORK / SCHOOL BUT ONLY IN GOOD WEATHER
- NO MORE THAN 10% OF HIS RIDING IS AT NIGHT
- MAJORITY OF TRIPS ARE IN THE CITY

Factors Related to Past Accidents and Convictions

The decision to employ canonical analysis in the initial assessment of factors potentially related to past accidents and convictions was introduced earlier in the section on data manipulation. Various canonical models were tested using different combinations of the four dependent variables. In doing so, it quickly became obvious that the amount of variance accounted for was disproportionate when both convictions and accidents were included in the same set. Violations dominated accidents in terms of the percent of variance explained and thus combining accidents and violations on the left side of the model would not have been a useful procedure. In addition, since the presence of total convictions as an independent variable when examining accident variance tended to dominate the correlations without providing much in the way of useful information, it was decided to use the presence or absence of convictions for different types of violations instead.

All class or categorical variables were effect-coded for this analysis procedure. Effect coding is usually preferred since this method generates regressions whose "b" coefficients reflect the effects of the treatments (Pedhazur, 1982).

Two canonical analyses were performed: one between 'motorcycle convictions/other-vehicle convictions' and motorcycle rider characteristics, and the other between 'motorcycle accidents/other vehicle accidents' and motorcycle rider characteristics. The results are summarized in tables 40 and 41. According to convention[1], only those independent variables demonstrating structural coefficients (correlations between themselves and their canonical variables) of about 0.3 or greater were selected for further consideration.

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[1] Pedhazur (1982) has suggested, based on earlier work by Cooley, Lohnes and Thorndike, that squared canonical correlations of less than 0.10 not be treated as meaningful. Tabachnick and Fidell (1983) have stated, based on Pedhazur, that variables having canonical correlation of less than 0.30 ($R_c^2 = 0.09$) are not normally considered for further interpretation.

Table 40
Results of Canonical Correlation Analysis Between Convictions and Motorcycle Rider Characteristics

Variables	First Canonical Variate		Second Canonical Variate	
	Structural coefficient	Standardized coefficient	Structural coefficient	Standardized coefficient
Convictions set				
Y_1 = other vehicle	0.63	0.49	0.77	0.89
Y_2 = motorcycle	0.88	0.79	-0.48	-0.64
Proportion of variance	0.59		0.41	(Total = 1.00)
Redundancy	0.26		0.07	(Total = 0.33)
Driver characteristics set				
Age 16-19	0.61	0.60	-0.00	0.23
Marital status	-0.51	-0.14	0.04	0.11
Gender	-0.46	-0.31	-0.06	-0.10
Days per week riding	0.40	0.10	-0.45	-0.32
Wear bright clothing	0.36	0.09	0.22	0.03
Don't ride at night (0%)	-0.35	-0.09	0.11	-0.19
Age 20-24	0.35	0.23	-0.02	0.08
Engine size $\leq$ 250 cc	-0.30	-0.19	0.09	-0.01
Licensed for motorcycle	-0.06	-0.01	0.51	0.45
Don't ride to work/school	-0.20	0.03	0.48	0.33
Riding experience: 25-48 mo.	-0.03	0.06	-0.34	-0.39
Motorcycle training: failed	-0.27	0.11	-0.35	-0.21
Motorcycle training: passed	-0.25	-0.23	-0.34	0.22
Proportion of variance	0.05		0.04	(Total = 0.09)
Redundancy	0.02		0.01	(Total = 0.03)
Canonical correlation (R_c)	0.67		0.41	
Canonical R-squared (R_c^2)	0.45		0.17	
Probability > F	0.0000		0.0000	

Table 41
Results of Canonical Correlation Analysis Between Accidents and Motorcycle Rider Characteristics

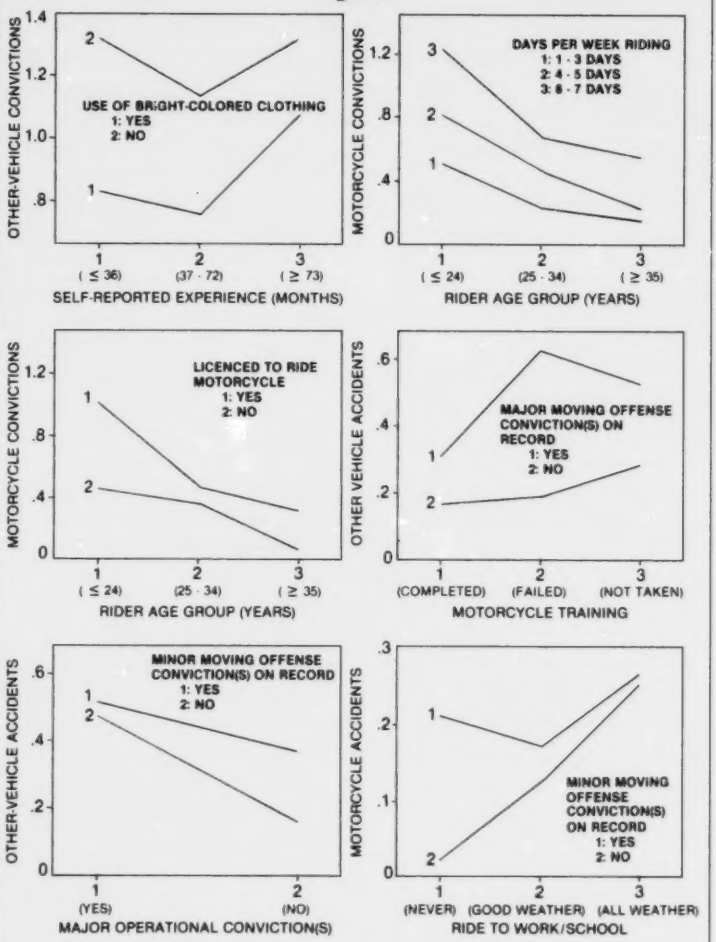
Variables	First Canonical Variate		Second Canonical Variate	
	Structural coefficent	Standardized coefficent	Structural coefficient	Standardized coefficient
Accidents sets				
Y_1 = other vehicle	1.00	1.00	-0.01	-0.14
Y_2 = motorcycle	0.13	0.01	0.99	1.00
Proportion of variance	0.51		0.49	(Total = 1.00)
Redundancy	0.12		0.10	(Total = 0.22)
Driver characteristics set				
Don't ride to work/school	0.08	0.10	-0.49	-0.30
Maj. mov. violations-other veh.	-0.48	-0.28	-0.05	0.01
Min. mov. violations-other veh.	-0.46	-0.23	-0.13	-0.11
Maj. mov. violations-motorcycle	-0.23	-0.07	-0.50	-0.40
Maj. oper. violations-other veh.	-0.44	-0.24	0.04	0.06
Maj. behav. violations-other veh.	-0.43	-0.28	-0.04	0.02
Age 16-19	0.41	0.38	0.24	-0.03
Min. oper. violations-other veh.	-0.40	-0.12	-0.11	-0.02
Days per week riding	0.20	0.15	0.37	-0.01
Min. mov. violations-motorcycle	-0.19	0.07	-0.35	0.02
Marital status	-0.30	-0.04	-0.23	-0.04
Motorcycle training-passed	0.30	-0.07	0.05	-0.41
Riding experience: 49-72 months	0.04	-0.15	0.30	0.37
Proportion of variance	0.04		0.03	(Total = 0.07)
Redundancy	0.01		0.01	(Total = 0.02)
Canonical correlation (R_c)	0.49		0.44	
Canonical R-squared (R_c^2)	0.24		0.20	
Probability > F	0.0000		0.0000	

In interpreting tables 40 and 41, it is the strength (magnitude) and sign (direction) of the structural coefficients which should be noted. For example, table 41 indicates that age 16-19 was strongly and positively associated with higher frequency of other-vehicle accidents and also positively, but less strongly and probably not significantly, associated with motorcycle accidents. Not riding to work or school, on the other hand, was significantly associated with fewer motorcycle accidents (negative structural coefficient with the second canonical variate). As mentioned earlier, however, the CA cannot explicitly define the relationships between dependent and independent variables. To do this we must revert to a more standard multivariate approach.

The next stage in the analysis was, therefore, to incorporate the significant independent variables from tables 40 and 41 in MANOVAS. For the case of motorcycle and other-vehicle accidents the distinction between the first and second canonical variates was clean-cut. That is, virtually all of the first variate related to other-vehicle accidents while virtually all of the second related to motorcycle accidents. It was therefore justifiable to run separate MANOVAS: the general independent variables having coefficients (correlations) of ≥ 0.3 from the first canonical variate versus other-vehicle accidents; and the general independent variables having coefficients of ≥ 0.3 from the second canonical variate versus motorcycle accidents. With convictions, this was not the case. Since the distinction was less well-defined, all independent variables having structural coefficients of 0.3 or greater were utilized in a MANOVA against both motorcycle convictions and other-vehicle convictions together. All main effects and interactions to the third level were run using the MANOVA routine in the SAS.GLM software for unbalanced cell design.

The analyses were largely clear of significant interaction effects ($p < .01$), but a few were found. These are illustrated in figure 4. Continuous variables have been broken into categories for this purpose in such a way as to optimize sample sizes per category. Convictions and accidents are expressed in transformed (square root) form.

Figure 4



SIGNIFICANT INTERACTION EFFECTS AMONG VARIABLES IN THE MANOVAS — TELEPHONE SURVEY DATA.

The main fact to be noted from all the above graphical representations of significant interactions between independent variables is that none of them exhibit disordinality (crossing effects). Thus while the presence of some moderate interaction should be noted, further discussion of the significant main effects is not invalidated.

The following variables (main effects) were significant at $p < .01$ (the usual convention for establishing significance in multivariate analyses):

(1) **Other-vehicle convictions** ($F = 1.73$, $p = .0001$, $R^2 = 0.45$)

- Age ($p = .0001$)
- Self-reported riding experience ($p = .004$)
- Gender ($p = .0001$)
- Days per week riding ($p = .002$)
- Wear bright clothing ($p = .0001$)
- Licensed for motorcycle ($p = .0001$)
- Engine size (marginal at $p = .012$)

(2) **Motorcycle convictions** ($F = 2.58$, $p = .0001$, $R^2 = 0.55$)

- Age ($p = .0001$)
- Gender ($p = .0001$)
- Days per week riding ($p = .0001$)
- Percent riding at night ($p = .0001$)
- Ride to work/school ($p = .0001$)
- Engine size ($p = .0001$)
- Marital status ($p = .003$)
- Wear bright clothing ($p = .004$)
- Motorcycle training (marginal at $p = .012$)

(3) **Other-vehicle accidents** ($F = 2.79$, $p = .0001$, $R^2 = 0.25$)

- Age ($p = .0001$)
- Motorcycle training ($p = .0001$)
- Minor operational violations (O/V) ($p = .0002$)
- Major operational violations (O/V) ($p = .0008$)
- Minor moving violations (O/V) ($p = .0001$)
- Major moving violations (O/V) ($p = .0001$)
- Major behavioral violations (O/V) ($p = .001$)

(4) **Motorcycle accidents** ($F = 4.13$, $p = .0001$, $R^2 = 0.12$)

- Days per week riding ($p = .0001$)
- Percent riding at night ($p = .0001$)
- Ride to work/school ($p = .004$)
- Minor moving violations (M/C) ($p = .007$)
- Major moving violations (M/C) ($p = .0001$)

To explain the directions of the above effects and to identify the critical categories of variables, we performed a series of one-way ANOVAs. Tukey's studentized (HSD) range test was employed to test for significance between pairs of categories. The results were as follows:

(1) Other-vehicle convictions

The age group 16 to 19 was associated with a significantly higher average number of other-vehicle convictions per rider than any other age groups except for that of ages 20 to 24 which had less but not significantly so.

Other-vehicle convictions per rider increased with the level of self-reported motorcycle riding experience.

Males had more other-vehicle convictions per rider than females.

Other-vehicle convictions per rider decreased as the number of days per week riding the motorcycle increased.

Those who did not wear bright-colored clothing while riding had more other-vehicle convictions per rider than those who did.

Unlicensed motorcycle riders had more other-vehicle convictions per rider than properly-licensed riders[1].

Average other-vehicle convictions per rider increased with the engine size of motorcycle operated.

(2) Motorcycle convictions

The age group 16 to 19 was significantly worse than all other age groups and the group 20 to 24 was significantly worse than all age groups above it.

Male riders were worse than females.

The number of motorcycle convictions per rider increased with the number of days per week the motorcycle was ridden.

The number of motorcyle convictions per rider increased with the percentage of time spent riding at night.

Those who rode to work/school in all weather had significantly more convictions than those who rode to work/school only in good weather; likewise, those who rode only in good weather had significantly more motorcycle convictions than those who did not ride to work/school at all.

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[1] While female riders and unlicensed riders did not constitute particularly large groups of subjects, the statistical methodology employed should have adequately corrected for any possible sampling effects.

Average motorcycle convictions per rider increased with the engine size of motorcycle operated.

Unmarried riders averaged more convictions than married riders.

Riders who reported wearing bright-colored clothing while riding had fewer average convictions than those who did not.

Those with motorcycle training had fewer average motorcycle convictions than those who had not taken training.

(3) Other-vehicle accidents

There were no significant differences among 16-19, 20-24 and 25-29 age groups (although the younger groups had the higher average number of accidents) but those from 30-34 up were significantly better than age 16-19 and those from 35-39 up were significantly better than age 20-24.

Those who had passed the motorcycle training course had a lower average other-vehicle accidents per rider than those who had not taken the course.

Those who had convictions for either minor or major operational violations, minor or major moving violations or major behavioral violations while operating other vehicles also averaged significantly more other-vehicle accidents than those who did not have such convictions on their records.

(4) Motorcycle accidents

The number of motorcycle accidents per rider increased with the number of days per week they reported riding.

The number of motorcycle accidents per rider increased with the percentage of time they reported riding at night.

Those who rode to work/school in all-weather conditions had significantly more motorcycle accidents per rider than those who rode only in good weather and the latter had significantly more than those who did not ride to work/school.

Those who had convictions for minor or major moving violations while riding a motorcycle also averaged significantly more motorcycle accidents than those who did not have such convictions on their records.

The above results can be briefly summarized as follows:

Young, single male motorcycle riders were more prone to violate traffic laws than other demographic groups and this also applied to their operation of other vehicles.

Age and gender did not appear to be as important in terms of accident-involvement but their influence was undoubtedly included in the conviction record which was used as a more specific behavioral indicator and evidently was a more efficient one.

Risk exposure was one of the most important factors in conviction or accident accumulation.

Lauditory attitudes and behavior presumably associated with taking special motorcycle training and/or wearing bright clothing while riding appeared to manifest themselves in fewer convictions, and even fewer accidents when operating (other) passenger vehicles, but could not be shown to influence the involvement in motorcycle accidents.

Since the effectiveness of formal motorcycle training was a central issue in this study, further investigation of this factor is possibly warranted. For example, are the very young, novice riders especially influenced by such training or does the training produce significant results only in the first year or two of riding?

The first suggestion, above, was easily tested by repeating the canonical analyses using the subset of riders first in the 16-19 age group and subsequently in the 16-24 age group. In neither case was motorcycle training identified as a potentially significant variable relating to motorcycle accidents.

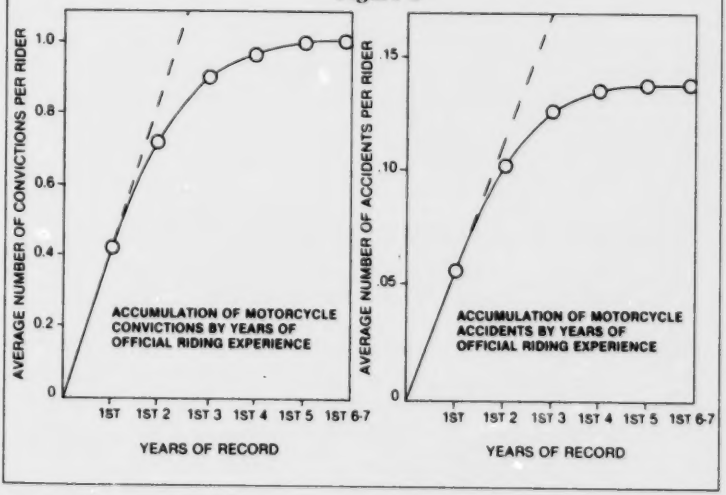
The second question is a more complex one but, based on previous driver education evaluations such as the Dekalb study (Stock et al., 1983), it was also a more interesting one. If structured learning simply enables riders to reach a point of sufficient technical proficiency somewhat ahead of that which would result from an unstructured learning process but, after that, things would be generally equal, then our only hope of finding an effect would be to examine the initial few months of riding. The way we approached this was to create new variables for each subject which accumulated their accidents and convictions by year following their recorded date of riding commencement. The mean number of accidents per rider during the first year of riding was certainly less for the trained operators (at 0.05) than for those with no formal training (0.08) but the small number of accidents led to high variances and the difference was not significant in a one-way analysis of variance. To be certain concerning the possible early effects of training, however, we went ahead with a multivariate approach using both first year and first two-year cummulative accident totals. Owing to the extreme nonnormality of the dependent variables,

a stepwise discriminant analysis[1] was employed to compare those having no convictions or accidents in the first year or first two years of riding with those having one or more.

Again, the extremely low number of riders having motorcycle accidents during year one (35) or even the first two years of riding (58) severely restricted the findings with respect to this dependent variable. The overall sample size was substantially reduced owing to the necessity of eliminating records with missing values before running the discriminant analysis. Not taking a motorcycle training course was indeed a significant discriminator ($p = .003$) between first-year conviction-involved and conviction-free groups (the average number of convictions was significantly higher for the non-trained group) but such was not the case with motorcycle accidents. Even with violation types removed from the analysis, only the variables "age 16-19" and percent nighttime riding achieved significance. Thus, this study could not find any evidence to suggest that motorcycle training (as represented by the single course in question) might have had a salutory safety effect as defined by police-reported accidents even during the initial stages of riding experience.

Figure 5 illustrates the overall effect of riding experience on the accumulation of accidents and convictions. For all motorcyclists, whether trained or not, the first two years (and particularly the first 12 months) are critical periods.

Figure 5



[1] A brief description of discriminant analysis appears in chapter 6.

Having covered the area of accident/conviction propensity and the efficacy of formal training in influencing it, we can now turn to a more general examination of motorcycle rider characteristics and, more specifically, how these are different for trained versus untrained operators.

A major impediment to establishing an effect of motorcycle training on subsequent motorcycle accidents, however, is that the majority of motorcylists' accidents are, by all accounts, not their fault. Hurt (1981) concluded that two-thirds of the multi-vehicle, motorcycle-involved accidents which he investigated were caused by the driver of the other vehicle; he also considered that the overriding cause of motorcycle accidents was the failure of other-vehicle drivers to notice the motorcycle. The British Columbia accident data indicate that less than 30% of motorcylists are judged to be wholly or partially responsible for causing the accident in which they are involved. More importantly, the past accident records of the 877 riders surveyed contained only 21 instances of the motorcycle rider being judged totally at fault (about 18% of the total number of accidents; if cases where the rider was partially at fault are included, the percentage rises to 29%).

Ideally, we would have wished to assess the impact of course-taking on the subsequent frequency of accidents for which the motorcyclist was assessed the blame but, given the extremely small number of these occurrences, such a procedure was not worth attempting. However, since "defensive driving" concepts are an important aspect of the training course, there is some justification for measuring success in terms of all subsequent accident involvements. In any event, an examination of the 34 totally and partially at-fault accidents revealed that 17 (exactly half) were on the records of the motorcycle course-takers. Since they also formed roughly half of our survey respondents, there was no indication that they were underrepresented in the sample of motorcyclist-at-fault crashes.

Factors Differentiating Trained from Untrained Riders

From a univariate perspective, an examination of tables 36 through 39 brings out a number of differences between trained and untrained riders. On the basis of a simple non-parametric test (the chi-square), however, only certain variables are worthy of note. Of the exposure measures, for example, only months of riding experience and preference for highway riding exhibit significant differences between trained and

untrained groups — more experience for untrained riders and greater preference for highway riding with trained operators. In terms of the vehicle ridden, more trained than untrained riders rode a borrowed machine but the latter were significantly more likely to be improperly licensed.

The major area of difference was obviously in the responses to the attitudinal and behavioural questions. The untrained riders were significantly more likely to disagree that only properly tested helmets should be worn, to feel that helmets impair hearing and vision, to consider helmet effectiveness overrated and to view helmets as uncomfortable and unsafe. Trained riders were significantly more likely to report wearing conspicuous and protective clothing. It is probable that the safer attitudes exhibited by the trained riders had some bearing on the significantly fewer violation convictions and self-reported mishaps which they had, but in the area of motorcycle accidents the overall frequencies were identical at 0.13 per rider for both the trained and untrained groups.

Proceeding now to the multivariate comparison, we performed a multiple discriminant analysis (SAS.STEPDISC) among the three training-related groups: (1) non-course takers, (2) course graduates, and (3) course failures (those who took the course but failed the test at the end). The significant results ($p < .01$ or close to it) were as follows:

Table 42
Results of Multiple Discriminant Analysis
On Surveyed Rider Data

Variable	No. in	Partial R^2	F statistic	Probability > F	Wilks' Lambda	Probability > Lambda	Avg. squared canonical correlation	Probability > ASCC
No. of mos. riding	1	0.123	39.5	0.0001	0.8772	0.0000	0.0614	0.0000
Licensed to ride	2	0.139	45.5	0.0001	0.7552	0.0000	0.1228	0.0000
Wear bright clothes	3	0.094	29.1	0.0001	0.6844	0.0000	0.1590	0.0000
Age 45+	4	0.066	19.8	0.0001	0.6392	0.0000	0.1904	0.0000
Think helmets overrated	5	0.040	11.7	0.0001	0.6134	0.0000	0.2041	0.0000
Most riding on hwy.	6	0.019	5.5	0.0045	0.6017	0.0000	0.2104	0.0000
Wear protective gear	7	0.017	4.8	0.0086	0.5915	0.0000	0.2161	0.0000
Age 40-44	8	0.015	4.3	0.0136	0.5825	0.0000	0.2212	0.0000

The sample size used was reduced to 567 (266 non-course takers, 269 successful course completers, and 32 course failures) through elimination of records containing missing data which cannot be handled in a discriminant analysis.

A second discriminant analysis was performed in which the four variables representing motorcycle and other-vehicle accidents and convictions were included. The results were virtually identical to the above with the same eight variables proving significant at the $p < .01$ level (age group 40-44 was again just above this level at $p = .0138$ but was included). The best discriminator from among the accident/conviction variables was the normalized version of motorcycle violation convictions, but at $F = 2.13$ ($p = 0.120$) it was not close to being a significant factor.

An examination of the means of the significant variables tabulated above revealed that there were no significant differences between those who passed the training course and those who failed, with the exception of the proportion of persons age 45 and over (45% of the 31 course failures were 45+ while only 10% of those successfully completing were in this group). Even had the sample size been higher in the failure group, the other variable means were so similar with those in the successful group that it is unlikely any additional variables would have shown significance. Other than an apparently higher proportion of older riders, therefore, there were no demonstrable differences between those who passed and those who failed the training course either in rider attitudes/demographics/riding behavior or in accident/conviction history. Some of the problems which older riders may have experienced with the formal training process were described in chapter 4.

The fact that those survey respondents in the "failed training" group had essentially the same characteristics and responses as the "successfully completed training" group, including both accident and conviction rates, was a further indication that the successful completion of training was not as important a factor in determining motorcycle accident or conviction risk as were other attitude or behavioral characteristics.

Similarly, the fact that trained riders had significantly fewer other-vehicle accidents than untrained riders and yet not significantly fewer motorcycle crashes argues against any effect of the specific motorcycle training component.

In further discussing the significant variables differentiating the training groups, it will therefore be sufficient simply to describe the difference between non-course takers and successful course takers. The means or percentages of the significant variables are listed in

figure 6. The two categories, age 40-44 and age 45+, owed most of their overall significance to the effects of the course failure group and were not significantly different between non-course takers and successful course-completers.

The interesting thing about the results in figure 6 is that, with the sole exception of self-reported experience, all the differences between trained and untrained riders were behavioral in nature.[1] Being properly licensed, wearing the right clothing and having positive attitudes towards helmets—all reflect attitudes held by safety-conscious people—and they were certainly heavily reinforced during the formal training. The highway riding differential is more surprising but could represent a higher level of self-confidence on the part of those who have taken a course of instruction which includes instilling familiarity with highway operation.

Figure 6
Significant Variables Differentiating Untrained Riders From Those Who Successfully Completed Training

Variable	No training	Successfully completed training
Self-reported riding experience in months	122.4	61.1
Properly licensed for motorcycle	76.8	98.9
Wear bright clothing while riding	37.5	71.4
Think helmet protection overrated	28.5	9.3
Most riding done on highway	23.6	39.0
Wear protective gear while riding	71.2	87.4

That there should be a wide disparity in self-reported riding experience is, at first glance, difficult to understand since all riders had officially between 3 and 5 years of riding as insured motorcycle operators in British Columbia. The probable explanation is that virtually all of the course-takers were novice riders who needed to take the course before

[1] It should be remembered that the original sampling by training group was also stratified (matched) by age and gender.

they felt comfortable riding while the non-course takers included a significant group of riders who had been riding "unofficially" for some years (perhaps mainly off-road) or else had been licensed in another province before moving to British Columbia. This is somewhat borne out by the lower licensed percentage in the non-course group and also by the fact (alluded to earlier in this report) that the number of self-reported accidents, while similar in overall distribution shape to police-reported accidents, nevertheless showed very little resemblance in case-by-case comparisons among respondents to the official recorded British Columbia accident history.

Finally, while conviction and/or accident history did not emerge as significant discriminators, the results of the more comprehensive canonical analysis are borne out in the comparison of means between course takers and non-course takers. The non-course takers had consistently, although not significantly, higher average accidents and convictions per rider (except for motorcycle accidents) than those who had completed the formal training program (figure 7). This, of course, does not take into account the longer exposure to risk (riding experience) for the untrained riders.

Figure 7
Differences In Accident And Conviction Rates
Between Trained And Untrained Riders

Variable	No training	Successfully completed training
Other-vehicle convictions (square root)	1.28	0.87
Motorcycle convictions (square root)	0.68	0.54
Other-vehicle accidents (square root)	0.37	0.22
Motorcycle accidents (square root)	0.13	0.13

(None of the above differences are significant due to the large associated variances.)

The fact that the third one of the variables in figure 7 (other-vehicle accidents) and the motorcycle training variable were significantly related in the Canonical/MANOVA procedure probably reflects the larger sample size available for use with the latter and also the greater power of the technique. Most often (Pedhazur, 1982) it is recommended that a MANOVA precede a discriminant analysis (DA) in order to determine whether there are overall significant differences among the groups. Subsequently, a DA can identify the dimensions along which the groups differ. If this were a general analysis, then in taking the training groups for application of DA we would be assuming that these are the optimum groupings for establishing differences in the various independent variables and such is obviously not quite the case. Our purpose here was simply to answer the question. "How do these two (or three) predetermined groups differ?" In this case, a DA is sufficient as a classification procedure.

CHAPTER 6
MOTORCYCLISTS AS REPRESENTED IN THE ACCIDENT DATA

P.J. Cooper

Introduction

Motorcyclists are a group especially at risk in both accident involvement and collision consequences. British Columbia data, in conjunction with the 1979 Transport Canada driver exposure survey, show that on a "per kilometre" basis a motorcyclist has more than twice the relative risk of accident involvement that a car driver has and, more critically, over nine times the risk of death or injury (Cooper, 1985).

The above facts are, at least qualitatively speaking, well-known. What is not perhaps so evident is the relationship between various motorcycle rider characteristics and safety—especially those characteristics related to rider training and experience.

Unfortunately, the British Columbia accident and insurance data do not currently include a specific reference as to whether or not a motorcycle rider has completed a recognized course of instruction. Experience, however, may be gauged through a consideration of age and licensing date. Other rider characteristics which could possibly reflect experience in riding are motorcycle ownership and engine size (Simpson and Mayhew, 1984).

The purpose of this chapter is, therefore, to describe the characteristics of accident-involved motorcycle riders in conjunction with the nature of their current and previous crash involvements. The main focus of the discussion will be on the rider characteristics described above which may be indicative of training and experience, but other situational factors will also be introduced. An examination of accident risk in the overall British Columbia riding population was also undertaken for comparison purposes and the results are presented towards the end of this chapter.

Data Organization and Analysis

The Database

The accident database employed was one constructed using data from police-attended motorcycle accidents occurring during 1984 which were then matched with related information from insurance claims and driver records. All identifying information used in the matching process was dropped once the matches had been made and thus the final joint database completely preserved rider anonymity.

Only just over half of the motorcycle riders on the accident database could be matched reliably with all the desired claim[1] and driving record data, and in a number of further cases, certain key information was missing (uncoded) from the records. The net result was that a file consisting of 821 accident-involved motorcycle riders was produced. Each of these 821 records contained all the available information on the 1984 accident (including whether or not a passenger was carried) and the data on the motorcycle and rider including the past accident/conviction record, which covers a period of up to seven years or so prior to November, 1985 when the database was constructed.

One caveat must be introduced at this point—the convictions listed on the driver records are as reported by the courts to the British Columbia Superintendent of Motor Vehicles. As a result of the past reluctance of some courts to pass on convictions (especially Criminal Code convictions) of juvenile offenders (16 year olds) to the MVD, there may be fewer of these offences on the records of 16-year old young drivers than actually occurred. Otherwise, the use of driving records as of late 1985 should have allowed ample time for the vast majority of 1984 offences to have been settled and recorded.

In the subsequent discussion concerning the results of the data analysis, comparisons which are, based on numerical differences, significant at the 5% level or better in a chi-square analysis, student's "t" or median test (as appropriate) will appear in boldface type. Generally speaking, the criteria employed for reporting differences in numerical values are that they be significant or else represent a consistent

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[1] The claim data include all insurance claims paid out against the rider's policy but exclude claims not arising from traffic accidents.

trend where three or more categories are represented. In a number of cases where moderate-to-large percentage differences were apparent but small sample sizes rendered them just short of significance, these have also been reported.

Basic Rider/Vehicle Characteristics

Vehicle Ownership

Motorcycle ownership was assessed from an examination of insurance and vehicle records. If the person identified in the accident record was not the one listed as the registered owner of the vehicle on which he/she was riding, then he or she was characterized as a non-owner (and vice versa). In the final motorcycle rider database used for this study, 74% of the 821 riders were classed as owners and 26% as non-owners. It should be noted that errors in recording the name and/or the driver licence number on the police accident form would most likely result in an over-estimation of the number of non-owners.

Those riders who were identified as owning the vehicle they were riding in the accident were not significantly different from those identified as non-owners in terms of whether or not their accidents occurred in bad weather and if they were reported as wearing a helmet.[1]

Neither did vehicle ownership have any discernable influence on the actions of the riders immediately prior to the accident.

Daytime versus nighttime involvement and city versus highway involvement[2] both were likewise unaffected by whether or not the riders owned the vehicles they operated. Similarly, while a higher proportion of the non-owner accidents were of the single-vehicle variety the difference (12.9% versus 10.9% for owners) was not significant.

There was no difference in the ratio of males to females in the two ownership groups but age distribution and experience were distinctly different (figures 8 and 9). The non-owner group contained a greater

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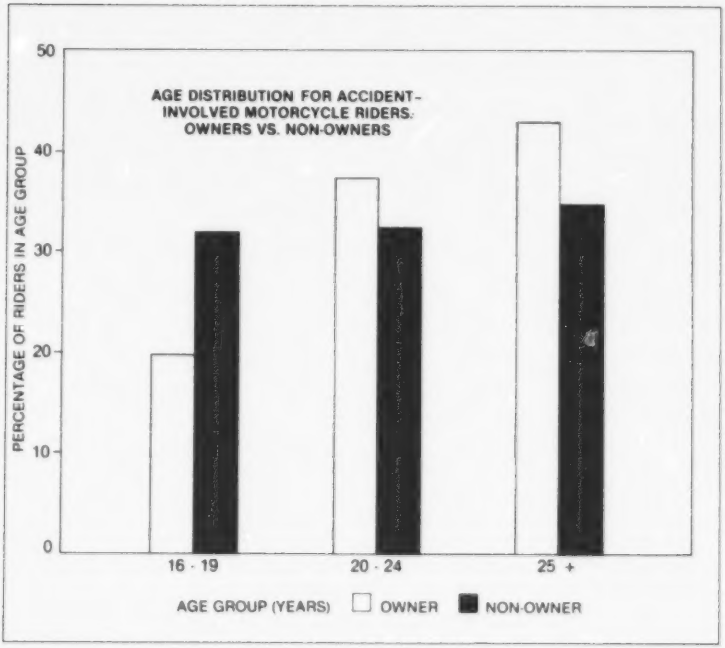
[1] Helmet wearing for motorcycle riders in British Columbia was mandatory when the database was constructed and the overall provincial wearing rate based on police-attended accident figures was estimated to have been about 95%. Thus there was little room for significant variations by rider/vehicle characteristics.

[2] Highway versus city involvements were determined through land use, road class and speed zone descriptions.

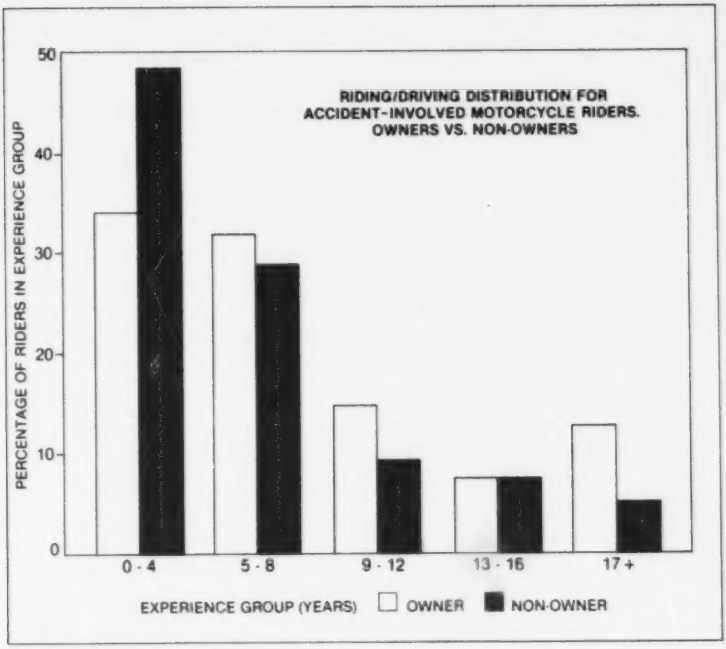
proportion of young riders (under age 20) than did the owner group (**32.4%** versus **19.8%**) and a greater proportion of those with less than three years driving or riding experience[1] (**30.9%** versus **12.9%**). The reason for this may be economic in nature since persons age 20 and older are more likely to have jobs and therefore will have the money or credit with which to purchase a vehicle. The fact that the proportion of non-owners who were in the low experience group (48%) was much more pronounced than was that in the young age group (32%), however, suggests an additional factor perhaps related to the gaining of experience and confidence before commitment to an expensive purchase.

Figure 8



[1] Riding experience was derived from the recorded dates of licensure but since the majority of riders were also licensed for passenger car operation, the experience factor so obtained cannot distinguish in many cases between motorcycle riding and passenger car driving.

Figure 9



A greater proportion of non-owners than owners (27.1% versus 19.5%) were carrying a passenger at the time of the crash. This may be to some extent a function of economic expediency but it may also be related to age characteristics.

Following the accident, the non-owners were more likely to be judged by the police as probable causers of the crash (35.0% versus 26.4% for owners). They were also half again as likely to be charged with an offence (**0.51** charges per rider as against **0.33**) and, when charged, were more likely than owners to be accused of major administrative/licensing infractions such as driving while under suspension (**34.6%** versus **22.6%**) as well as minor operational violations such as producing a loud and unnecessary noise or improper seating on the motorcycle (**8.7%** versus **3.2%**).

On the other hand, the vehicle owners were more likely to be charged with major behavioral offences such as drinking-driving (**11.6%** as against **5.8%**).

Police were more likely to assign to accident-involved non-owners, accident-contributing factors related to the ignoring of traffic control devices (6.5% versus 3.0%) and inexperience (10.3% versus 6.6% for owners). This latter difference is consistent with the age and experience factor already documented. Conversely, police were more likely to assign factors associated with improper lane use (e.g., passing and turning, etc.) to owners than to non-owners (**14.1%** versus **7.1%**). Weather was also mentioned as a contributor **4.7%** of the time for owners as opposed to **1.6%** for non-owners.

Considering the total past conviction records of the accident-involved riders, the non-owners averaged higher (3.25 per rider) than owners (3.01 per rider)—a difference just short of significance. When convictions, claim and accident totals were compared on an average yearly experience basis per rider[1] it was again found that non-owners had somewhat higher conviction and accident rates (0.83 and 0.21 versus 0.61 and 0.17 for owners).

With total convictions broken-down into categories of conviction type (as with charges), we found that non-owners were more likely to have convictions for major administrative/licensing offences (8.2% versus 6.2% for owners) and also for minor operational infractions (10.2% versus 7.9%). While non-owners also had a higher proportion of their convictions for major behavioral offences than owners (6.0% and 4.6%, respectively), the difference was again not significant for the sample size available.

Motorcycle Engine Size

Overall, the most popular size of motorcycle was the 401-750 cc range which accounted for 48% of the sample. Twenty-nine percent were 400 cc or less and 23% were greater than 750 cc. Since the corresponding figures for the overall British Columbia motorcycle population are 38% and 20% respectively, there is some indication of large vehicle overrepresentation in the accident-involved sample.

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[1] Equivalent annual conviction, claim and accident rates were calculated for each rider using total recorded frequencies divided by length of experience up to a maximum of seven years which represented the greatest age of historical records in the accident/violation data. For all variables except age and experience, those riders having less than 2-years experience (147 in number) were excluded from the rate calculation in order to minimize confounding effects of age/experience. (These records were, of course, included in the multivariate analyses described later.) For different rider groupings, means and standard deviations were calculated for use in test comparisons. The accident rates consist of all accidents since motorcycle collisions alone could not reliably be identified on the historical driver records.

Engine size did not have a bearing on the proportion of accidents which occurred at night or in bad weather. Neither was there any consistent effect of engine size on the likelihood of riders to be wearing helmets at the time of the crash (those with vehicles of 400 cc or less had a slightly higher wearing rate) or their likelihood of being subsequently judged at fault by the police.

There was a consistent tendency for larger motorcycles to be involved in a higher proportion of highway accidents (5.7% for 400 cc or less, 9.5% for 401-750 cc and 11.9% for greater than 750 cc). In keeping with this, motorcycles over 400 cc were involved in a greater proportion of single-vehicle crashes (11.9%) than those of 400 cc or less (8.0%). The contribution of such pre-collision actions as turning and performing hazardous manoeuvres such as overtaking, swerving, etc. was also higher for larger motorcycles. Turning at the time of the crash was related to 6.6% of riders with bikes 400 cc or less, 9.7% of drivers with bikes 401-750 cc, and 10.3% of drivers having bikes greater than 750 cc. For hazardous manoeuvres the proportions were 10.6%, 11.6% and 13.0%, respectively.

Fewer operators of smaller motorcycles (400 cc or less) were carrying passengers at the time of the accident (**15.0%**) than were operators of larger motorcycles (**24.1%**). Even though motor scooters were not included in the database, this effect could still be a function of practicality related to room and power.

Increasing motorcycle size carried with it an increased likelihood of police-assigned, accident-contributing factors related to alcohol and drugs (4.5% for riders of vehicles 400 cc or less, 6.1% for 401-750 cc vehicle riders, and 10.1% for operators of motorcycles bigger than 750 cc). Conversely, there was a tendency for inexperience to be decreasingly assessed as a factor in accident causation: 10.7% for 400 cc or less, 8.0% for 401-750 cc, and 3.4% for greater than 750 cc.

The tendency of larger motorcycles to be more associated with highway involvement and alcohol is probably somewhat connected to gender. Females were much more frequently associated with small motorcycles (400 cc or less) than males (**63.3%** versus **27.3%**—significant in spite of the very small sample of female riders). There was also a greater propensity for older riders to operate larger motorcycles (figure 10). Just over half (**55.6%**) of those age 16-19 were riding motorcycles greater than 400 cc while for 20-24 year-olds the percentage rose dramatically to **71.6%**. The peak seemed to occur for the 25-44 age group, with those 45 and over having a somewhat reduced association with large vehicles. An examination of motorcycle size by driving/riding experience yielded similar results (figure 11), and there

did seem to be a tendency for size to decrease again beyond 12 years of experience. Since over 96% of the riders were male, the apparent age/experience relationship with vehicle size is not compounded by gender effects. While it would be nice to think that young, inexperienced motorcycle operators are acting responsibly and are not riding vehicles beyond their ability to control, it is far more likely that the effect is due to the significantly higher cost of larger motorcycles which puts them out of the economic range of those without reasonably well-paying, full-time jobs.

Figure 10

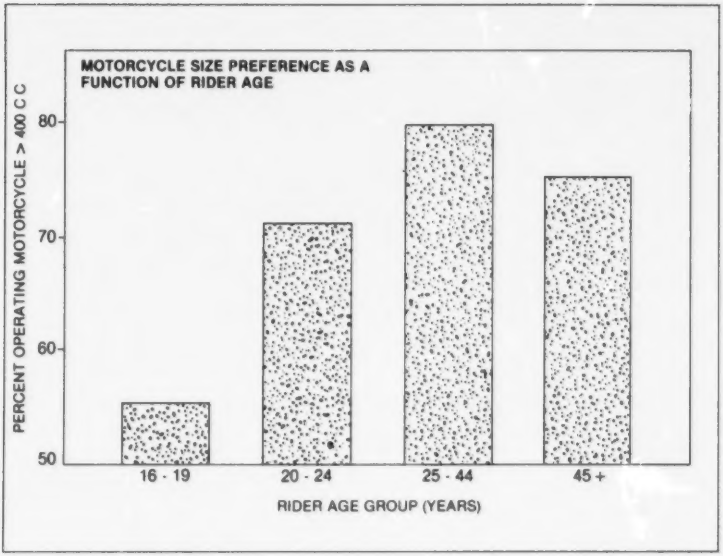
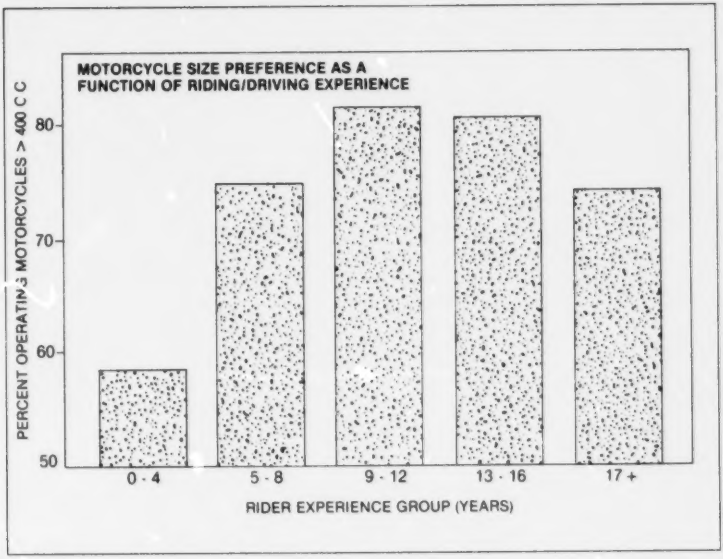


Figure 11



Turning to the aftermath of the accident, riders of large motorcycles (> 750 cc) were assessed a greater proportion of accident-related police charges having to do with major behavioral offences (18.0% versus 7.3% for riders of motorcycles ≤ 750 cc). This was also reflected, although much less obviously, in past conviction records (6.9% versus 5.0%, respectively). On the other hand, riders of the smaller motorcycles were more likely to have recorded convictions for minor operational infractions (9.3% versus 6.6% for riders of motorcycles > 750 cc).

There were no consistently significant trends in corrected yearly frequency of total accident and claim experience for riders of different size vehicles. Those with two or more years of experience and riding motorcycles greater than 750 cc had a slightly lower accident rate (0.16) than those with two or more years of experience and riding motorcycles 750 cc or less (0.18) but the difference was not significant. These results, which do not consider the interrelationship of engine size with other variables, are more or less consistent with an assessment reported by Simpson and Mayhew (1984) but not with the findings of Bragg et al. (1980). There were no significant differences in conviction rate for riders of different size motorcycles with two or more years of experience.

Riding/Driving Experience of Motorcycle Operators

As mentioned previously, calculated experience was based on the date of obtaining the type of licence that was currently held by the rider. Since the majority of riders had a combination (usually motorcycle plus passenger car) licence it was assumed that motorcycle riding began at the time of obtaining this licence. For those with only a passenger car licence, we could only assume that motorcycle riding commenced at the date of passenger car licensure with the rider perhaps unaware of the need for further motorcycle endorsement. In any event, some 15% of the riders had less than two years of experience and 46% had less than five years' experience. This contrasts markedly with the overall British Columbia population of riders where less than 2% have two-years experience or less and only 12% have five or fewer years. Inexperienced riders are thus substantially overrepresented in the accident-involved population.

There was, generally, no significant trend in the proportion of nighttime involvements by experience level, although those with 16 years or more had (at **12.0%**) a significantly smaller proportion than those with lesser experience (at **28.3%**). It was similar with weather conditions—while there were no consistent or significant trends in proportion of poor-weather occurrences in relation to experience group, those riders with 16 years or more experience again had the lowest percentage.

There were also no significant or consistent differences by experience level for highway versus city involvement (although those with less than three years' experience especially had fewer highway involvements), for proportion of incidents which involved a single vehicle, for helmet wearing at the time of the accident, or for different categories of pre-collision actions.

There was a higher percentage of motorcycle operators carrying passengers where experience was less than or equal to two years (26.4%) than when experience was greater than two years (19.9%). Similarly, a somewhat higher proportion of those with two years' experience or less was judged to represent probable accident causers than was the case with those who had more than two years' experience (33.6% versus 27.6%).

In terms of police-assigned, accident-contributing factors, the only variations of any consistency and magnitude by experience (apart from the obvious factor of "inexperience") were for alcohol/drugs and failure to yield. Alcohol or illegal drugs were cited in 4.6% of the cases for those with 4 years' experience or less, 7.7% for those with 5 to

8 years and 8.4% for those with 9 years or more. Failure to yield was assigned to 5.3%, 7.2% and 9.4%, respectively. There was some evidence to suggest that both these behaviors decreased in importance beyond 16 years of experience.

With charges laid by police as a result of accidents, the only consistent difference by rider experience level occurred for minor operational infractions. For those with 4 years' experience or less, such charges formed 2.1% of the total, rising to 6.8% for those with 5 to 8 years and 8.5% for those with 9 years or more.

For conviction records, which list all Highway Traffic Act and Criminal Code traffic convictions independent of accident involvement, the story was entirely different. Here, there was a significant trend in major behavioral offences in correspondence with the earlier finding with respect to accident-contributing factors: those riders with 0 to 4 years' experience had 3.0% of their convictions for major behavioral offences, those with 5 to 8 years had **5.3%**, those with 9 to 12 years had 6.9% and those with 13 or more years had **11.0%**. Age is obviously a factor in such differences, as will be discussed later, but since legal drinking in British Columbia begins at 19 years of age—a scant three years following licensure for the vast majority of riders or drivers—this factor alone cannot account for a significantly increasing incidence of predominantly drinking-driving offences for experience levels of over 13 years.

When the number of yearly convictions[1], claims and accidents were examined (see figures 12 and 13), we found that motorcycle riders having a recorded experience of less than two years had significantly higher averages than those with two years or more (**2.08**, **0.81**, **0.60** versus **0.65**, **0.27**, **0.17** for convictions, claims and accidents, respectively). A secondary reduction in conviction and accident experience seemed to occur following six years' experience. As mentioned previously, there is even an expectation that not all convictions for 16-year olds (juveniles) may have been reported by the courts and thus the higher levels recorded for those with less than two years experience are likely even more significant than they appear. Thus, the results generally confirm the conclusions of most previous studies (Hurt et al., 1981; Dwyer and McCord, 1980; Mortimer, 1984; and Johnson et al., 1970) that riders with low levels of experience have more accidents.

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[1] See earlier footnote on accident, claim and conviction rate calculations. In this case, riders having less than two years of experience were included. In calculating convictions and accidents per year for those with less than two years of experience, there was minimum distortion due to very low experience levels (less than ½ year) since only eight convictions and three accidents fell into this category.

Figure 12

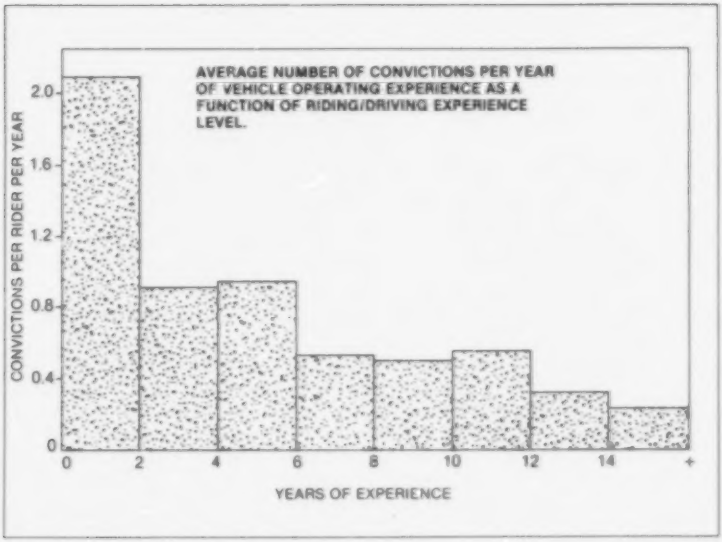
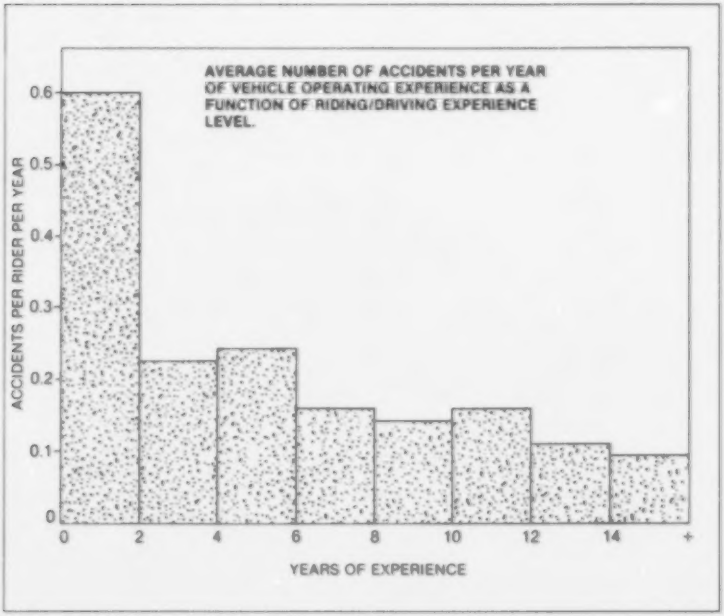


Figure 13



Rider Age

The vast majority (74%) of the motorcycle riders in the database were between age 20 and 44. About 23% were under 20 years of age and only 3% were over 44. The broad age groups used here were chosen to match the ones employed as selection criteria for the motorcycle rider interview study, which was reported previously.

A preliminary indication of the influence of age on accident risk may be inferred from the above when we consider that only 2-1/2% of riders in the overall British Columbia motorcycle population are under 20 years old and 17% are over 44. Young riders are thus greatly overrepresented in the accident population as are inexperienced ones.

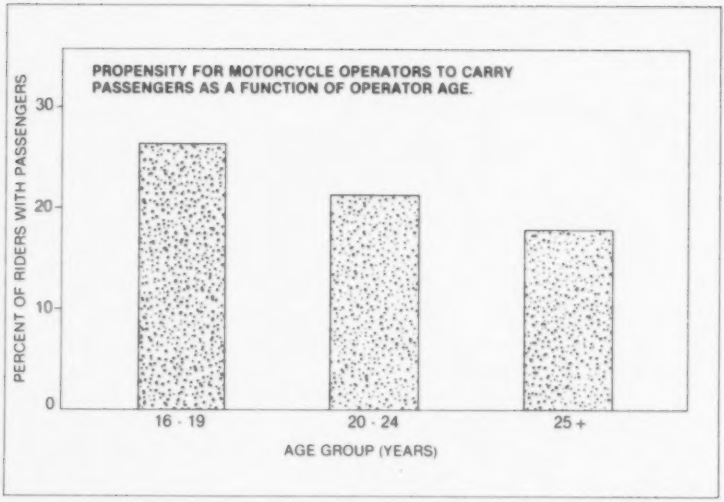
As with experience, no significant trends were evident in percent nighttime involvement, percent single-vehicle involvement or percent bad weather involvement by age. Helmet wearing did not appear to be related to the age of the rider.

While there was no apparent effect of driver age on propensity for single-vehicle involvements, there was a consistent trend evident for percent of involvements which occurred on highways. This proportion increased with age: 6.7% for ages 16 to 19, 7.6% for ages 20 to 24, 11.3% for ages 25 to 44 and 13.0% for age 45 and up. This result was not as consistently evident when considering experience alone.

There was a slight trend for riders to be increasingly more involved in accidents during or following turning movements as age level increased (6.7%, 9.2% and 10.0% for age groups 16 to 19, 20 to 24 and 25+, respectively). The results with respect to hazardous prior manoeuvres were not consistent by age group, nevertheless, the 16 to 19 year-olds had (at **16.9%**) a significantly higher proportion of accidents following such manoeuvres than did those 20-years old and over (**10.1%**).

Young riders were also more likely to be carrying a passenger when the accident occurred (figure 14). Of those 16 to 19 years old, 26.7% had a passenger as opposed to 21.9% for 20 to 24 year-olds, 18.6% for 25 to 44 year-olds and 12.0% for those age 45 and up. Since no major differences were found by experience, this may be interpreted as probably a function of age group characteristics (e.g., social activities, etc.). Similarly, young riders (ages 16 to 19) were more likely to be judged by the police to have caused the accident than were older riders (**35.0%** versus **26.7%**).

Figure 14



Three consistent trends were identifiable from police-assigned, accident-contributing factors: alcohol/drugs, failure to yield and weather. All of these increased in importance with age group, although none did so significantly. Alcohol/drugs, for example, went from 3.5%, 5.8% to 9.2% for age groups 16-19, 20-24 and 25 + , respectively.

There were no significant differences in the proportion of various charge types by age group, although there was a tendency for minor operational charges to increase with age (such as exceeding the speed limit, etc.) and minor moving charges to decrease with age (12.5%, 11.3% and 6.6% for minor moving charges against 16-19 year-olds, 20-24 year-olds and those 25 years and older, respectively).

Again, however, convictions were a different story. The proportion of major behavioral convictions increased significantly with age. Those riders ages 16 to 19 had **1.3%**, those ages 20 to 24 had **5.4%** and those age 25 and over had **8.2%**. Conversely, the proportion of convictions for minor moving offences decreased markedly with age (**56.0%**, **48.1%** and **42.1%**, respectively for the above age groups) as did that for minor operational infractions (11.2%, 8.0% and 7.6%, respectively).

Motorcycle riders under 20 years of age[1] had significantly more convictions and accidents per year of experience[2] than those ages 20 to 24 (**1.40** and **0.39** versus **0.89** and **0.24** for convictions and accidents respectively). Similarly, those ages 20 to 24 had more convictions and accidents per year of experience than those 25 and over (**0.89** and **0.24** versus **0.43** and **0.14**). This confirms the results of Hurt, et al. (1981) and Mortimer (1984).

Gender of Motorcycle Rider

Unfortunately, since only about 4% (34 out of the total sample of 821) of the accident-involved motorcycle riders were female, comparisons between variables by gender were often futile. Those described below are where large percentage differences were present which, had the same size been only slightly larger, might have been significant.

Female riders were more likely to be involved in accidents where the weather conditions were poor and were less likely to be involved in highway situations than males. They also appeared to be less likely to have accidents which followed from hazardous manoeuvres.

Female operators were less likely than male operators to be carrying passengers and were also less likely to be judged by police as having been the likely causer of the accident in which they were involved. They were also less likely to be involved in single-vehicle incidents than males and less likely to be convicted of major behavioral offences.

The sole areas where gender difference had significant impact were in motorcycle size selection (described earlier) and in the accumulation of convictions on an average yearly basis. For the latter case, males averaged **0.69** convictions per year and females averaged **0.26**. There was no discernable difference in average accident rate, although female riders were underrepresented in the accident population since they represent over 10% of insured riders. This is not in agreement with the findings of Hurt, et al. (1981).

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[1] Refer to previous caveat regarding young rider conviction records.

[2] Refer to footnote regarding rate calculations in section on ownership.

Rider/Accident Situational Factors

Presence of Passengers

About 21% of the total sample of riders were carrying passengers at the time of the accident. Riders carrying passengers were significantly more likely to be assigned accident contributing factors related to the use of alcohol or drugs (**11.9%** versus **4.6%** for those riding alone). They were also more likely to be operating a motorcycle whose mechanical condition contributed to the accident (4.6% versus 1.9% for solitary riders). Motorcycle operators with passengers were involved in a much higher proportion of single-vehicle accidents (**26.8%**) than those without passengers (**6.4%**). There was also an indication of greater helmet non-wearing with the former although the differences (5.8% versus 3.8%) were not significant.

There were no major differences in the proportions of the various charge types arising from accidents, by whether or not the motorcycle operators were carrying passengers. Similarly, there were no significant differences in proportions of recorded conviction types. The number of charges and past convictions per rider were, however, significantly higher for those carrying passengers than for those riding singly at the time of the crash (**0.47** versus **0.35** for charges and **4.96** versus **2.55** for past convictions). In terms of average yearly totals per experienced rider for convictions, claims and accidents, motorcycle riders reported as carrying passengers at the time of the accident had nearly twice the record of those without passengers (**1.10** versus **0.56** for convictions, **0.44** versus **0.24** for claims and **0.25** versus **0.16** for accidents).

Young riders, who were more likely to be carrying passengers than older riders, also had significantly more convictions and accidents than older riders but the evidence linking the presence of passengers to the incidence of single-vehicle collisions is not at all consistent with what we have earlier seen in this regard with respect to rider age.

Time of Day

Of all the accidents represented on the motorcycle rider database, about 27% occurred at night. This is not markedly different from the figure for all injury-producing accidents in British Columbia during the same time period—about 30% nighttime involvements.

As expected, a much higher percentage of nighttime motorcycle accident-contributing factors were assigned to the alcohol and drug categories (**14.6%**) than was the case for daytime involvements (**2.5%**). In conjunction with this, riders involved in accidents at night were more likely to have been unhelmeted (6.3%) than those involved during the

daytime (3.5%). Daytime accidents, on the other hand, produced a higher proportion of factors concerned with improper lane use (13.8% versus 8.0% at night) and following too closely (7.6% versus 3.8% at night).

Weather was cited as a contributing factor in accidents more frequently at night (5.6%) than during the day (3.0%)—an indication of the cumulative effect of both ambient conditions on net visibility. These effects are undoubtedly compounded by alcohol involvement. Motorcyclists involved in accidents at night had almost double the proportion of single-vehicle involvements (**15.9%**) as did those who crashed in the daytime (**8.8%**) and were six times more likely to be charged with major behavioral offences such as drinking-driving (**21.2%** versus **3.6%** for night and day, respectively).

Overall, those riders who had accidents at night were charged at a higher rate than those involved during daytime (**0.48** charges per rider versus **0.34**) but major moving violations such as disobeying a traffic control device were more prevalent for those in daytime crashes (49.2% versus 35.4% at night).

The distribution of past convictions on the records of nighttime versus daytime accident-involved riders showed noticeable differences in two areas: major behavioral offences (**7.2%** for those involved at night versus **4.6%** for those involved during the day) and minor moving infractions (a higher proportion for daytime involvements—49.4% versus 43.9%). In terms of total recorded convictions, those with accidents at night averaged **4.07** per rider while those involved during the day had only **2.72**. When corrected for length of experience, it was found that experienced motorcycle riders (2+ years) involved in nighttime incidents had significantly higher average annual frequencies of convictions, claims and accidents than did those involved during daytime (**0.88** versus **0.60** for convictions, **0.38** versus **0.25** for claims, and **0.24** versus **0.16** for accidents).

Weather

Good-weather involvements were defined as those where prevailing conditions were clear or cloudy with no precipitation and with no major hinderance to visibility such as fog. These conditions characterized about 91% of all the motorcycle rider involvements.

Motorcycle riders involved in accidents during poor weather conditions (i.e., precipitation, fog or smog/smoke, etc.) were, not unexpectedly, assigned "weather" as a contributing factor much more often than those who had accidents when the weather was good (**26.9%**

versus **1.2%**). The latter group was significantly more likely to be assigned factors associated with improper lane use (**13.1%** versus **3.0%** for poor weather accident involvements).

It is probable that poor weather conditions may induce a measure of caution in riders which could reduce the number of passing manoeuvres. This could also explain why a greater proportion of good weather accidents (11.5%) were of the single-vehicle variety, which often involves loss of vehicle control, than was the case with incidents in bad weather conditions (8.3%). The fact that major moving violations (e.g., speeding too fast for conditions) and minor moving violations (e.g., exceeding the speed limit) were proportionately more frequently charged against accident-involved riders in good weather than in bad (46.3% versus 32.4% and 11.2% versus 2.9% respectively) tends to support this possibility.

Somewhat in contradiction to the above, however, was the indication that those riders involved in crashes under poor weather conditions had a greater proportion of major moving convictions (25.7%) on their records than did those involved during good weather (19.8%). In terms of total yearly convictions, claims and accidents, there were no meaningful differences.

Location of Accident

The incidence of motorcycle rider involvements on highways was quite small, representing just over 8% of the total. A highway was defined as a roadway having a posted speed limit of over 60 km/h and surrounded by non-urban forms of land use such as industrial, agricultural or recreational. The definition included entrance and exit ramps on divided, access-controlled facilities.

There were no significant differences in police-assigned contributing factors for riders in accidents occurring on highways versus those on city streets or arterials. There was a relatively large difference in the proportion of factors related to alcohol and drugs—9.0% for highway involvements as opposed to 5.9% for city.

As might be expected, a far greater percentage (**22.7%**) of highway incidents were of a single-vehicle configuration than was the case with urban crashes (**9.3%**).

There were no significant differences in the distribution of charge and past conviction categories for riders by location. However, while there was also no significant differences in average annual convictions, claims and accidents with riders having two or more years of

driving/riding experience, those whose accidents occurred on highways had substantially higher levels of all three indicators—only the small sample size for highway involvements kept the results from being significant.

Pre-Collision Rider Action

The overwhelming majority (72%) of riders were categorized by the police as proceeding straight ahead at the time of, or immediately preceding, the collision.

As one might expect, the accident contributing factor "failure to yield" was much more often applied to those in the act of turning (**25.4%**) than those going straight ahead (**5.9%**) but this same factor and also that of following too closely were assigned significantly less to those engaged in hazardous pre-collision actions such as overtaking and swerving (**0.8%** and **0.8%** for failure to yield and following too closely, respectively) than to those riders going straight ahead (**5.9%** and **7.1%** respectively).

Those going straight ahead were assigned "unsafe speed" more often than those engaged in turning manoeuvres (**16.2%** versus **3.0%**) but those performing hazardous manoeuvres were not, interestingly enough, assigned this factor more often.

Riders engaged in turning movements were more likely to be assigned alcohol/drug factors (11.9% versus 6.1%) than those going straight ahead but those undertaking hazardous manoeuvres were not. This latter group were far more likely to be associated with lane-use factors such as improper passing or driving on the wrong side of the road than were those judged to be going straight ahead (**33.6%** versus **6.1%**). These "hazardous manoeuvre" riders also had a higher proportion of single-vehicle involvements than those simply classed as going straight ahead (16.5% versus 10.6%). Though this difference was not significant, such an indication is consistent with the greater likelihood of loss-of-control associated with hazardous manoeuvres. The proportion of riders involved in hazardous manoeuvres who were not wearing a helmet was, at 7.5%, somewhat higher than that for riders classed as "going straight ahead" (4.3%).

Motorcycle riders involved in turning manoeuvres at the time of the accident were far more likely than those going straight ahead to be charged with major behavioral offences (such as drinking-driving) as a result of the accident (**26.5%** versus **7.0%**). Those performing hazardous pre-collision actions were more likely to be charged with major moving infractions (58.3%) than those going straight ahead (41.1%).

While riders involved in turning or hazardous manoeuvres were somewhat more likely to have prior convictions for major behavioral offences (6.0% and 6.5%, respectively versus 5.0% for those going straight ahead), the only really significant difference was for major operational offences such as failure to wear a helmet, where involvement on the part of turning riders was less likely (at **1.8%**) than for those going straight ahead (at **5.6%**).

Experienced riders with pre-collision actions involving turning (especially left-turns) and hazardous manoeuvres had almost twice the average number of annual convictions, claims and accidents per rider as did those who were proceeding straight ahead at the time of the crash. Turning riders had **0.92** yearly convictions per rider, **0.48** yearly claims per rider and **0.28** yearly accidents per rider. Those engaging in hazardous manoeuvres had **1.05**, **0.44** and **0.27** respectively; those going straight ahead had **0.58**, **0.24** and **0.16**.

Probable Causer of the Accident

Overall, some 29% of the motorcycle riders in the database were judged by police to have probably caused the accident in which they were involved. This is substantially lower than the 36% applicable to other-vehicle drivers and thus lends some support to motorcyclists' claims that motorists are "blind" to their presence on the road.

Those riders assessed as probable causers were more likely to be assigned accident contributing factors related to alcohol or drugs (8.0% versus 4.7% for those not at fault) and to driving without due care (**23.5%** versus **11.9%**). On the other hand, they were less likely to be assigned weather-related factors (**1.9%** versus **6.5%**). Factors related to actions such as unsafe speed, following too closely, etc. were also associated more with accident causers than those not at fault but the differences were not significant.

Those judged probable causers were also more likely to be riding unhelmeted (**5.4%** versus **3.5%** for those not so judged). As a corollary to this, riders assessed accident-contributing factors related to alcohol/drugs, driving without due care and unsafe speed were more likely to have been riding unhelmeted (**15.0%**, **9.0%** and **6.1%**) than those riders for whom the police assigned no contributing (causal) factors (**2.3%**).

We would expect a higher proportion of single-vehicle incidents to be associated with riders judged at fault than with those not at fault and this was indeed the case (**18.9%** versus **7.5%**) but the fact that in only 50.0% of all the single-vehicle crashes was the motorcycle rider judged to have precipitated the accident is perhaps cause for questioning the meaningfulness of the data in this area.

Motorcycle riders judged by the police to be the probable causers of the accident in which they were involved were more likely to be charged with major moving violations (**54.2%**) than those who were not so judged (**30.8%**). They were, however, less likely to be charged with minor operational infractions (2.8% versus 8.5%) and with major administrative/licensing offences (**17.5%** versus **41.0%**). Understandably, those judged probable causers were over three times as likely to be charged as those not considered responsible (**0.79** charges per rider versus **0.21**).

Interestingly, there were no significant differences by conviction type on the records of those judged accident causers as opposed to those not faulted. As with charges, however, the average number of convictions per rider was over three times higher for the former group (**5.93** as against **1.92**). The average yearly convictions, claims and accidents per rider were also significantly higher for those judged at fault (**1.37**, **0.56** and **0.32**, respectively) than for those not judged at fault (**0.40**, **0.18** and **0.12**).

As a corollary to the above discussion of accident causers, it is interesting to note that, in the five years prior to their 1984 accident, of those riders who had been riding during this entire period, 84% had not been involved in any crashes. Thus, 16% of the operators accounted for all the accidents (a relative risk of 6.3) during this 5-year period and, in fact, there was a group of riders who represented only one percent of the sample but had 18% of the accidents (a relative risk of 18.0). This is a strong indication of recidivism—a small group of high-risk riders who are responsible for a large proportion of the accidents. Rider characteristics related to accident and violation-involvement will be examined in the next section.

Factors Jointly Affecting Rider Accident and Violation History

Up until now, our analysis has centred on simple univariate comparisons but it is evident that many of the major variables discussed are interrelated. In order to assess the independent effects of these factors (with covariance removed) it is necessary to examine a multivariate approach.

The conduct of multivariate analysis requires that the variables employed have approximately normal distributions. This is relatively easy to achieve for most of the continuous independent variables such as age, experience, and engine size, etc. but for the major dependent variable of accident count, with its high proportion of zeros, such is not the case. One way to get around this is to conduct a discriminant analysis comparing a group of no (or low)-accident riders with a group of those having more accidents. The discriminant analysis identifies the best set of criterion variables which differentiate between the two groupings (or class levels) of the data. Directionality is established from a univariate comparison of the means of the significant criterion variables.

While the available databases may identify those qualified to ride a motorcycle and also those involved in a recent accident while riding a motorcycle, it is not possible to establish which, or how many previous accidents were associated with motorcycle riding. This information is not kept on the computer records and, unfortunately for our purposes, less than one percent of all British Columbia licensed motorcycle riders are licensed solely for motorcycle operation. It was thus decided to utilize the full historical driver records but to limit the analyses either to those whose most recent, identifiable accident had occurred while they were riding a motorcycle or to those who at least possessed a valid motorcycle licence and carried current insurance for such a vehicle.

The British Columbia Licensed Motorcycle Rider Population

Using the driver/vehicle insurance records, a database was constructed containing all current motorcycle policyholders (February, 1987) and listing the following factors:

- age
- gender
- riding experience
- licence type
- motorcycle engine size
- accident history (count)
- violation history (count)

No personal identifying information was employed in the database construction or retained in the final database.

The total population size was just over 50,000 records but after records containing missing or obviously erroneous data (mostly licensing dates) were removed and those apparently without valid motorcycle licences were eliminated, a final sample of 8,851 licensed motorcycle riders was achieved. Using a standard of 3 as the kurtosis value for judging the limits of approximate normality, all the remaining independent variables qualified for inclusion with the exception of rider gender (91% were male).

Table 43

(a) Accidents (0 versus 1+)

Variable	No. in	Partial R^2	F statistic	Probability > F	Wilks' Lambda	Probability > Lambda	Avg. squared canonical correlation	Probability > ASCC
Age	1	0.027	245.7	0.0001	0.97298	0.0000	0.02702	0.0000
Experience	2	0.026	231.4	0.0001	0.94819	0.0000	0.05181	0.0000
Engine size	3	0.005	47.2	0.0001	0.94316	0.0000	0.05684	0.0000

(b) Convictions ($\leq$ 2 versus 3+)

Variable	No. in.	Partial R^2	F statistic	Probability > F	Wilks' Lambda	Probability > Lambda	Avg. squared canonical correlation	Probability > ASCC
Age	1	0.069	652.3	0.0001	0.93134	0.0000	0.06866	0.0000
Experience	2	0.051	471.5	0.0001	0.88422	0.0000	0.11578	0.0000
Engine size	3	0.032	291.4	0.0001	0.85603	0.0000	0.14397	0.0000

The SAS module "STEPDISC" was employed to conduct a stepwise discriminant analyses comparing accident-free with accident-involved riders and also low-conviction with high-conviction riders. Since the median number of convictions per rider was close to 3, this value was used to distinguish high from low-conviction riders. The results are shown in table 43.

The number of convictions has not been included in the independent variable set as a potential predictor of accidents as indicated in table 43(a). If the violation count is included, it accounts for almost all the intergroup variation explainable with these four variables. The other factors are reduced proportionately in significance (table 44).

Table 44
Accidents (0 versus 1+) With Convictions Included As An Independent Variable

Variable	No. in	Partial R^2	F statistic	Probability > F	Wilks' Lambda	Probability > Lambda	Avg. squared canonical correlation	Probability > ASCC
Convictions	1	0.105	1035.3	0.0001	0.89526	0.0000	0.10474	0.0000
Age	2	0.007	61.9	0.0001	0.88903	0.0000	0.11097	0.0000
Experience	3	0.010	87.1	0.0001	0.88036	0.0000	0.11964	0.0000
Engine size	4	0.001	4.6	0.0317	0.87991	0.0000	0.12009	0.0000

Examining the mean values of the three variables (age, experience and engine size) in each of the class level groupings, we found that the accident-involved group and the high-conviction group were both characterized by lower age, greater experience and greater engine size. We found young riders to be more often in the high accident and conviction groups than in the low ones. In addition, there was a tendency for riders of larger motorcycles to have more accidents and convictions independent of age and experience (although the confidence level of 0.0317 in table 44 was greater than the 0.01 normally required for significance of individual variables in multivariate analysis).

The fact that length of riding experience was greater in the high accident and conviction groups does not mean that inexperienced riders are safer. What we are likely seeing here is the effect of longer exposure. We can correct for this by calculating two new variables—accident and conviction rates—based on the number of years exposure to risk. Since the "average" British Columbia driver has one accident every 6 to 7 years, a level of 0.15 accidents per year is a reasonable demarkation point between better-than-average and worse-than-average.

Accordingly, another discriminant analysis was performed between the group of riders having 0.15 accidents per year or less and those having more than 0.15. Similarly, an analysis was conducted using two class levels of convictions per year—0.3 or less and greater than 0.3.

The results were similar to those for accident and violation counts in that age, experience and engine size were significant (though low-level) predictors, but now the average experience level was significantly ($p < .01$) lower for the high risk group. Again, where the conviction rate was included as an accident rate predictor it dominated the correlation, although to a somewhat lesser extent than had been the case with the accident count analysis. For accident and conviction rates, all the independent variables shown in table 43 were significant ($p < .01$) both with and without the inclusion of the conviction rate as a predictor of accidents.

The conclusion we may draw from the foregoing analysis and discussion is that, at least, rider age, experience and motorcycle size choice appeared to be significant factors in explaining accident risk and conviction rate for motorcyclists in British Columbia. High-risk riders tended to be younger and less experienced, and were more likely to be operators of large, more powerful motorcycles than their low risk counterparts. Most importantly, high conviction rates were the best predictor of high accident rates. The low level of overall variance explained by these factors suggests that there are other, possibly more important, variables but we were limited in our selection by what was available on the database.

British Columbia Motorcycle Riders Involved in Accidents

The accident-involved rider database yielded 620 complete records for analysis. As with the general population data, the extreme non-normality of the accident and conviction distributions dictated a discriminant analysis procedure using these as the dependent or criterion variables.

Since over half (58%) of the records had no associated accidents (motorcycle or other vehicle) in the prior history, the logical groupings were: no accidents before the one of record (prior accident-free) and one or more accidents before the one of record (prior accident-involved). Similarly, since the median number of convictions per rider was, as for the population sample, close to three, the logical groupings for examining effect on convictions were: less than three total recorded convictions, and three or more total recorded convictions.

The accident groupings were N = 363 for prior accident-free and N = 257 for prior accident-involved riders. The conviction groupings were N = 400 for riders with less than three convictions and 220 riders with three or more convictions. The independent variables included in the SAS STEPDISC analysis were:

- rider age
- motorcycle engine size
- riding/driving experience
- previous alcohol-related conviction(s) (Y/N)
- own motorcycle (Y/N)

Last accident situation:

- helmet worn (Y/N)
- probable offender (causer) (Y/N)
- day or night
- good or bad weather/road conditions
- city or highway
- passenger carried (Y/N)

Only three of the above were continuous variables; all others were converted to dummy variables. Even more than with the rider population sample, the number of females was so low that gender as an independent variable could not be normalized sufficiently for use in a multivariate analysis. It was thus excluded.

Table 45
Accidents (0 Versus 1 +)

Variable	No. in	Partial R^2	F statistic	Probability > F	Wilks' Lambda	Probability > Lambda	Avg. squared canonical correlation	Probability > ASCC
Conviction count	1	0.527	689.10	0.0001	0.47280	0.0000	0.52720	0.0000
Probable offender	2	0.084	56.44	0.0001	0.43318	0.0000	0.56682	0.0000
Age	3	0.013	7.84	0.0053	0.42774	0.0000	0.57226	0.0000
Accident in city	4	0.009	5.33	0.0213	0.42406	0.0000	0.57594	0.0000

Note: Convictions included as independent variable

Accidents: convictions included as independent variable

Only conviction count, probable offender (causer) in last accident and age were significant at the $p < .01$ level normally required in multivariate analysis. Higher conviction counts and a greater proportion of riders judged to have caused their last accident characterized the prior accident-involved group in comparison with the accident-free one. The question of age was a more complex issue. Generally speaking, within each category of total convictions, the average accident count was higher for older riders. The peak in many cases was for the 20 to 24 age group and this can be partially explained by drinking age (19 years), but the fact that riders 16 to 19 years old had lower average accident totals than most other age groups was most probably due to the same effect as occurred with experience in the rider population analysis. In other words, longer exposure to risk produces more accidents. An examination of accident rate (per year) is thus indicated and will be discussed subsequently.

Table 46
Accidents (0 Versus 1+)

Variable	No. in	Partial R^2	F statistic	Probability > F	Wilks' Lambda	Probability > Lambda	Avg. squared canonical correlation	Probability > ASCC
Probable offender	1	0.198	152.99	0.0001	0.80157	0.0001	0.19843	0.0001
Alcohol	2	0.148	106.91	0.0001	0.68319	0.0001	0.31681	0.0001
Passenger	3	0.017	10.54	0.0012	0.67170	0.0001	0.32830	0.0001

Note: Convictions excluded from independent variables

With the count of convictions omitted, being the probable offender in the rider's last accident was the most important accident group discriminator, followed by alcohol (defined as one or more previous convictions for alcohol-related offences; a binary variable: 0 or 1) and, finally, the carrying of a passenger at the time of the last accident (again, a binary variable). No other variables met the $p < .01$ criterion or were even significant at $p < .05$. In addition to a higher proportion of last-accident causers, the prior accident-involved group had a higher proportion of riders with prior alcohol convictions and a greater percentage of riders who had been carrying a passenger at the time of their last accident (table 46).

Table 47
Convictions (≤ 2 Versus 3+)

Variable	No. in	Partial R^2	F statistic	Probability > F	Wilks' Lambda	Probability > Lambda	Avg. squared canonical correlation	Probability > ASCC
Alcohol	1	0.224	178.27	0.0001	0.77612	0.0001	0.22388	0.0001
Probable offender	2	0.119	82.93	0.0001	0.68416	0.0001	0.31584	0.0001
Passenger	3	0.023	14.25	0.0002	0.66869	0.0001	0.33131	0.0001
Accident in city	4	0.006	3.56	0.0597	0.66485	0.0001	0.33515	0.0001

In explaining the difference between low-conviction and high-conviction riders, the most important variable was whether or not the rider had had a previous drinking-driving (alcohol) conviction. Other than this, the only two significant factors were also related to the last recorded accident: the carrying of a passenger and being the probable offender in the accident situation as judged by the police. As with accidents, the high-conviction group was characterized by a higher proportion of all three variables (table 47).

Table 48
Accident Rate (≤ 0.15 per year versus > 0.15)

Variable	No. in.	Partial R^2	F statistic	Probability > F	Wilks' Lambda	Probability > Lambda	Avg. squared canonical correlation	Probability > ASCC
Conviction rate	1	0.327	300.34	0.0001	0.67295	0.0001	0.32705	0.0001
Alcohol	2	0.092	62.56	0.0001	0.61100	0.0001	0.38900	0.0001
Probable offender	3	0.066	43.24	0.0001	0.57093	0.0001	0.42907	0.0001
Accident in city	4	0.007	4.24	0.0400	0.56702	0.0001	0.43298	0.0001

Note: Conviction rate included as an independent variable

The high-accident rate group was characterized by higher conviction rates, a higher proportion of those with previous alcohol convictions and a higher proportion of riders carrying passengers than was the low rate group. Age was not a factor in discriminating high-accident rate from low-accident rate groups (table 48).

Table 49
Accident Rate ($\leq$ 0.15 per year versus > 0.15)

Variable	No. in	Partial R^2	F statistic	Probability > F	Wilks' Lambda	Probability > Lambda	Avg. squared canonical correlation	Probability > ASCC
Probable offender	1	0.141	101.60	0.0001	0.85881	0.0001	0.14119	0.0001
Alcohol	2	0.103	70.90	0.0001	0.77030	0.0001	0.22970	0.0001
Experience	3	0.026	16.69	0.0001	0.74998	0.0001	0.25002	0.0001
Passenger	4	0.013	7.90	0.0051	0.74048	0.0001	0.25952	0.0001

Note: Conviction excluded from independent variables

In table 49, with conviction rate excluded, riding/driving experience at the time of the accident of record was found to be significant in discriminating high-rate from low-rate groups. The high-accident rate group had the lower average experience and, as before, the highest proportion of drinking-driving offenders, probable accident causers and those carrying passengers. Again, age was not a significant factor.

Table 50
Conviction Rate ($\leq$ 0.3 per year versus > 0.3)

Variable	No. in.	Partial R^2	F statistic	Probability > F	Wilks' Lambda	Probability > Lambda	Avg. squared canonical correlation	Probability > ASCC
Alcohol	1	0.201	155.18	0.0001	0.79929	0.0001	0.20071	0.0001
Probable offender	2	0.153	111.02	0.0001	0.67741	0.0001	0.32259	0.0001
Passenger	3	0.026	16.53	0.0001	0.65971	0.0001	0.34029	0.0001
Age	4	0.010	6.13	0.0136	0.65320	0.0001	0.34680	0.0001
Accident in city	5	0.006	3.68	0.0556	0.64931	0.0001	0.35069	0.0001

As illustrated in table 50, it was found that for the high-conviction rate group the proportions of those with previous drinking-driving offences, those considered at fault and those carrying a passenger in their latest accident were greater than for the low-conviction rate group. Age was marginally significant, with the high-rate group having a lower average age.

While there was no way to differentiate between motorcycle and other-vehicle accidents/convictions on the computerized driver records, it would not be unreasonable to assume (based on the riding characteristics found in the telephone survey and from patterns of insurance policy cancellations) that the majority of motorcycle accidents and convictions would occur from May to October when the weather is more favorable. Redoing the discriminant analysis using only these data, therefore, might produce results more representative of motorcycle situations alone but, on the other hand, the number of incidents would be substantially reduced and variances increased as a result.

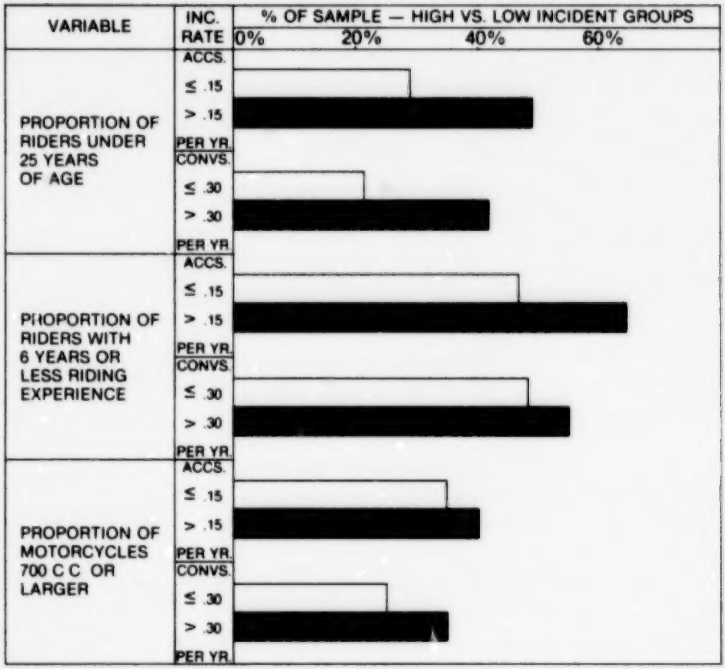
Such an analysis was undertaken, with the result that alcohol and probable offender were still the most important variables in discriminating both the accident and violation groups. The carrying of passengers was significant ($p < .01$) for convictions but not significant for accidents. Riding/driving experience was also important ($p < .01$) in explaining accident and violation rate group differentiation.

Summary and Discussion

Obviously, to a great extent the results are influenced by the choice of variables employed. With the population database, only a few basic demographic and motorcycle/licence variables were available whereas for the accident-involved rider database a wide range of information having to do with time, location and characteristics of riding at the point of the crash was obtainable. Some of these riding characteristics or actions which relate directly to the accident of record probably subsume many of the basic demographic variables such as age, gender, etc., which represent more distal and indirect factors in predicting accident or violation involvement.

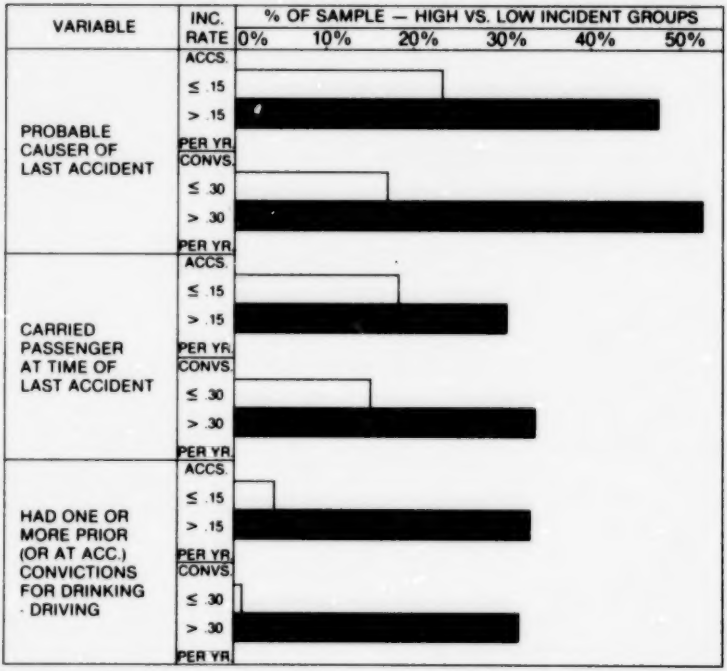
Thus for the overall population database we found age, experience and motorcycle engine size to be significant factors in discriminating good from poor riders (see figure 15) whereas when recent accident-involved riders were examined, the best "explainers" of past transgressions tended to be found among the actions they displayed particularly at the time of their last accident or the temporal/environmental situation in which they were then operating (see figure 16). The three main action or situational factors which were repeated most consistently throughout the results were: the use of alcohol (drinking-driving), the causing of the crash (being judged at fault by the police) and the carrying of a passenger.

Figure 15
Critical Safety-Related Variables for the General Population of Riders



As figure 16 clearly illustrates, the major indictor of past accidents in the accident-involved rider sample was the judgment of accident cause in the last incident. Historically, high-risk riders were much more likely to be assessed causal responsibility in their last accident than were those having low-risk records.

Figure 16
Critical Safety-Related Variables for Accident-Involved Riders


VARIABLE
INC. RATE
% OF SAMPLE — HIGH VS. LOW INCIDENT GROUPS
0%
10%
20%
30%
40%
50%
PROBABLE CAUSER OF LAST ACCIDENT
ACCS. ≤ .15 > .15 PER YR.
CONVS. ≤ .30 > .30 PER YR.
CARRIED PASSENGER AT TIME OF LAST ACCIDENT
ACCS. ≤ .15 > .15 PER YR.
CONVS. ≤ .30 > .30 PER YR.
HAD ONE OR MORE PRIOR (OR AT ACC.) CONVICTIONS FOR DRINKING - DRIVING
ACCS. ≤ .15 > .15 PER YR.
CONVS. ≤ .30 > .30 PER YR.

A logical sequence or connection may be postulated as follows. Young, inexperienced riders who ride large, more powerful machines get into difficulties as a result of their inexperience in combination with a tendency toward risk-taking behavior (presumably a manifestation of the attitudes which lead them to purchase or operate powerful motorcycles in the first place). This risk-taking or sensation-seeking propensity is linked to the carrying of passengers (as seems to be the case with young drivers in general—Rothe, 1987) and the consumption of alcohol. This leads to actions which are more likely to cause an accident rather than just involvement as an innocent party.

It should be noted, however, that accident fault and passenger carrying are linked to accidents and violations independent of age. For example, while age was previously described as being not significantly related to the incidence of single-vehicle collisions, those riders carrying passengers were over four times as likely as those riding alone to be involved in such incidents.

The results with respect to previous drinking-driving involvement agree with those of Bragg et al. (1980). The appearance of engine size as an important accident-related variable in the population sample analysis does not conform to Bragg's results or the conclusions of Simpson and Mayhew (1984) but, as suggested above, engine size in this case may simply be a substitute for rider characteristics related to risk-taking.

An important factor which must be recognized in any attempt to "marry" these different sets of results is that with the second (accident-involved) group we are not dealing with the accident/violation propensities of the "average" rider—only with that subgroup of the general riding population whose members had accidents during one particular year of record. It is thus likely that these results apply to a group having a somewhat higher risk level than would be representative of the total riding population at the same point in time.

CHAPTER 7
SUMMARY AND RECOMMENDATIONS

J.P. Rothe
P.J. Cooper

Characteristics of Motorcycle Riders

The following items describe the more significant factors which characterize motorcycle riders in British Columbia. These conclusions are an amalgamation of the telephone survey (questionnaire) results, the overall British Columbia rider population sample analysis, and the description of riders involved in accidents.

- Contrary to the popular conception of motorcyclists which probably still owes something to "B"-grade movies of the '60s and '70s, the untrained riders who we interviewed were found to have a higher proportion of university, college or business/trade school graduates (41.4%) than was present in the over 15-year old population in British Columbia (about 29%). Motorcyclists who had taken formal training tended to be even better educated with over 53% being university, college or business/trade school graduates.
- Again, contrary to stereotype, the average motorcycle rider (based on the British Columbia motorcyclist population) is between the ages of 25 and 44—not the age group one associates with youthful "irresponsibility."
- While less than 3% of riders in the overall British Columbia population are under 20 years of age, however, those involved in accidents seem to have a much larger contingent of such young riders (23% in this study). This is an area to which more attention should be paid in terms of future safety programs.
- Only a small proportion of motorcycle riders have actually completed a training course and most have made no effort to take one since they felt confident in their ability to ride without formal instruction. They already knew how to ride, in other words.
- A significant portion of active motorcycle riders are unlicensed. This does not seem to be the case with trained riders who took their licensing exam at the conclusion of their course, but for the majority of riders (who have received no formal training), up to 20% may not be properly licensed to operate a motorcycle.
- Over 95% of the interviewed riders owned their motorcycles, but for motorcyclists involved in accidents in a given year only 74% were vehicle owners. This suggests that unfamiliarity with the vehicle may be a factor in crashes.

- The most popular engine sizes are 400 cc and 750 cc. About 64% of our surveyed sample and 62% of the overall British Columbia riding population had motorcycles 400 cc or greater in size. By contrast, 71% of those involved in accidents had motorcycles 400 cc or greater. Motorcycle engine size, while an important variable in accounting for accident variance in the general riding population, was not a factor in explaining accident experience among the interview participants for whom a comparatively large body of attitudinal and behavioral information was known. This suggests that engine size may not, in itself, be a contributer to accident risk (as in a control problem for example) but rather may simply be just one outward manifestation of basic sensation-seeking characteristics and image.
- Most motorcycle riders in British Columbia also operate other (passenger) vehicles and riding tends to be somewhat of a seasonal phenomenon. In bad weather they choose other forms of transportation, but when conditions are good they ride their motorcycles a fair amount—over 2-½ hours per day for 4 to 5 days per week, often on regular work/school trips and almost always for pleasure. Most trips are taken within urban environments (where 91% of their accidents occur).
- Motorcycle riders, and especially those having received formal training, generally have a positive attitude towards protective clothing and equipment—including helmets (although over half consider these restrictive in some way). They don't appear to be concerned about their own conspicuity, however, inspite of the fact that studies (Hurt, 1981) have shown that a large portion of car/motorcycle collisions result from the failure of the car driver to notice the motorcycle. Our own analysis of accidents indicated that motorcyclists are judged at fault only 29% of the time in all accidents in which they were involved. For multi-vehicle accidents only, the figure was 26%. The question of conspicuity is thus an area where safety program attention should be directed.

Factors Affecting Conviction and Accident History

As before, the following conclusions bring together the three different databases examined in this study. Factors affecting convictions and those influencing accidents are discussed separately.

Convictions

- Young riders (16 to 19) were particularly associated with high conviction rates in the interview sample and within the British Columbia motorcycle population sample. Male young riders were especially implicated from the interview sample (where sufficient numbers of females were present to allow assessment of the effects of gender). Unmarried riders were associated with a higher level of motorcycle violation convictions than those who were married.
- The absolute number of convictions per rider increased with years of riding exposure (experience). When this was corrected for in the population sample, it was found that riders with lesser experience had higher conviction rates (per year).
- Two other exposure measures, riding to school or work and riding at night, both had a direct relationship to the number of recorded motorcycle convictions per rider. Understandably, these variables had a significant inverse relationship to the number of other-vehicle violation convictions. Riding under all-weather conditions (a two-fold exposure consideration) as opposed to riding in good weather only also carried with it the penalty of more convictions.
- Bright-colored, conspicuous clothing was not a priority with most riders, but those who did report wearing it had significantly fewer motorcycle and other-vehicle convictions. Since conspicuity in itself could not normally be considered to influence the likelihood of being caught or convicted for traffic violations, it must be assumed that this predisposition represents an attitudinal factor that is consistent with careful, prudent riding.
- The fact that unlicensed motorcycle riders had more other-vehicle convictions than those properly licensed, probably represents another manifestation of the exposure factor elucidated above. Of the unlicensed riders in our survey, only 40% rode to work or school whereas almost 61% of properly licensed riders did so (and therefore spent less time in other vehicles).
- Both motorcycle and other-vehicle convictions per rider increased with higher engine size of motorcycles operated.
- Being the probable causer of the latest accident, having previous alcohol-related driving/riding convictions and carrying a passenger at the time of the last accident—all were positively related to increased total violation (conviction) history. The passenger factor is especially interesting since it conforms with conclusions reached by Cooper in Rothe (1987).
- Motorcycle training was a marginal indicator ($.01 < p < .05$) of lesser convictions for motorcycle violations.

Accidents

- Young, single male riders were not at the high risk to be involved in accidents that they were to accumulate violation convictions. Age was an important factor only in the population sample where available information was linked mainly to demographic characteristics.
- Convictions for various classes of moving violations and behavioral violations (most notably drinking-driving) were strongly linked to greater incidence of crashes. Being the likely causer of the last recorded accident was also found to be a good indicator of prior driving mishaps.
- One of the most consistently important factors relating to motorcycle accidents was riding exposure, length of experience, and frequency of riding (daily to work/school in all weather conditions). This confirms the results of Bragg et al. (1980) who found exposure in terms of kilometres travelled during the preceding four-year period to be the most important factor discriminating accident-free from accident-involved riders.
- There was a strong indication that carrying a passenger on the motorcycle was associated with higher accident rates. Young riders were especially implicated. This finding is consistent with that previously reported for young drivers (Cooper in Rothe, 1987) and is further linked with alcohol involvement. This may provide a useful focus for the development of traffic safety programs in terms of either education or regulation. In the latter area, provisional licences (or an extension of existing provisions) might be considered which prohibit the carrying of passengers for the first year or two of riding.
- Those riders who had taken formal training had accumulated fewer other-vehicle accidents per rider than had those with no training. Since the trained riders reported riding more often to work/school and more often in all-weather conditions than untrained riders, the fewer other-vehicle accidents could well have simply been a reflection of less driving exposure in other vehicles. In any event, there was no evidence to support a connection between formal training and the incidence of motorcycle accidents.

The reader must be cautioned against generalizing this last conclusion to include any and all possible training programs. In this study, formal training was represented by one specific course of instruction which is described in first-hand detail in chapter 4. Our results showed that taking this specific course was not significantly linked independently with lower motorcycle accident rates.

There is also the sample size factor to consider. While there were 862 riders in our survey sample, there were only 118 recorded motorcycle accidents and only 34 of them were cases where the motorcyclist was judged at fault. There is always the possibility that a larger sample size might have produced significant results. On the other hand, the implied level of association between motorcycle accidents and the training variable was extremely low in the canonical analysis and the negative results of this study with respect to training effectiveness are supported by other work (Jonah et al., 1982) where larger samples were employed.

Most importantly, it must be taken into account that the act of undergoing formal training is a self-selection process. Certainly, the use of multivariate techniques to sort out the various factors retrospectively may be sufficient to detect training program effects (Jonah et al., 1982) but because our sampling is unavoidably biased in the first place it may be unreasonable to expect any effects to emerge. That is, people with good, prudent attitudes towards driving or riding are predisposed to become good drivers. They also tend to take training as a natural outgrowth of these attitudes. Rather than being an independent factor, therefore, driver or rider training is simply a manifestation of more important factors in their make-ups. Since people with poor attitudes are almost never represented in driver/rider training groups, what we are really evaluating are the safety differences between a group of particularly or even exceptionally responsible people and what amounts to a closer approximation of the general riding/driving population. The completion of a driver training course may be incidental within this larger context.

What the results may be telling us therefore, is that if you already have the makings of a prudent driver or rider, formal training is not likely to make you any better. The critical question of whether or not formal training will improve the <u>average</u> or substandard vehicle operator cannot be answered without complete random assignment to control and experimental study groups—a solution that has obvious ethical and political drawbacks. Such a study has recently been concluded in New

York (see Buchanan and Tarrants (1980), referenced in chapter 2). At time of writing, the results had not yet been published. Early indications, however, have not led to an expectation of very positive results in terms of rider training effectiveness.

A further interesting result of the study was that rider gender did not emerge as a significant factor in differentiating "safe" from "unsafe" riders. Gender was excluded from both the rider population sample analysis and the accident-involved rider analysis because of extreme nonnormality of the distribution but, owing to the telephone survey sample stratification, there was an opportunity to examine its effect in the latter context. While the surveyed female riders had significantly fewer convictions than their male counterparts, gender did not emerge as an important independent factor in explaining accident record differences. This account would seem to run counter to expectations based on previous findings with respect to vehicle drivers generally (Cooper, 1985; Stewart and Sanderson, 1983). Again, however, it should be noted that the rider-action variables found significant in the accident-involved rider analysis may subsume elements of gender-based characteristics or propensities.

Factors Differentiating Trained from Untrained Riders

Following upon the foregoing discussion of rider training as a possible factor in predicting subsequent accident risk, it is worth reiterating the characteristics which apparently differentiate trained from untrained riders as determined from our interview sample.

- Trained riders—because the training is taken to learn how to ride, gain confidence, and lead directly to licensure—may tend to have self-reported riding experience closer to the officially recorded version. Untrained riders may gain considerable "unofficial" experience prior to actual licensure and thus feel that formal training for them is unnecessary.
- Some riders who have not undergone formal training may never bother to obtain a valid motorcycle licence. These tend to be part-time riders (i.e., not usually regular work/school commuters). By contrast, the trained riders are almost invariably properly licensed as a direct result of their prevailing purpose in registering for the course in the first place.

- Trained riders, either as a result of inherently more cautious attitudes or specific instruction during the course, apparently favor the wearing of conspicuous attire while riding much more than do those who are untrained. They also appear to have a higher opinion of helmet protection potential and therefore would be less likely to ride without one.
- One of the major reasons cited by trained riders for taking the formal course of instruction was to gain confidence. A possible indication of the extent to which the training succeeds in this respect is that the trained riders rode significantly more on highways than did those without formal training.
- Trained riders tend to have somewhat fewer accidents and convictions for traffic violations than do untrained riders but the former difference, at least, cannot be ascribed to the training process on its own.

Recommendations For Intervention Strategies

It was encouraging to find promising results from the study. These findings indicate that motorcycling is a complex phenomenon in terms of characteristics, organization, training and individuality. Our research design cast a wide net on motorcycling. We avoided the extreme approach of using only a few categories to define the characteristic qualities of the motorcycling phenomenon. The concept of individuality and experience of training was paramount in establishing a series of relevant findings.

Consistent with our basic assumption that motorcycling is isomorphic with experiences of self and others, research on traffic activities should account for this as well as to describe broad statistical trends which relate to stylized behaviors. The greater the amounts and kinds of information elicited the more confident we are in reporting motorcyclist behaviors and characteristics.

Whenever researchers provide statistical evidence on trained versus untrained motorcyclists they neglect to remind us that the effectiveness of training relates to what happens in training courses. Much like watching a movie whereby the viewer fills in the time between a person entering an elevator on the ground floor and exiting on the twelfth floor, traffic safety researchers expect readers to fill in the space of everyday training activities and sense-making on the road. By filling in the blanks

we established that at the practical level, although safety concepts were discussed, students and instructors were pre-occupied with training for the motorcycle licence. Students had a variety of reasons for attending the course; reasons which influenced their behavior, expectations and relationships. Student grouping, instructional processes, resources, learning events and instructor training all contributed to motorcycle training courses, on the basis of which motorcyclists illustrate certain characteristics.

The trained motorcyclists displayed a high level of self-confidence on the road and were more apt to be properly licensed and reflect positive attitudes towards safety features such as helmets. Training also appeared to have a marginally-significant benefit in terms of fewer traffic violation convictions. Yet we could not show any effect of motorcycle training with respect to subsequent number of accidents. The existence of too many uncontrolled variables, such as self-selection for training, makes a clear cut decision on the question of whether motorcycle training courses help lessen the number of crashes untenable.

The character of motorcycling, whether the rider is trained or untrained, is guided by the mediation of behavior in public places. That is, personal motives, self-image, view of others, the aesthetic nature of the driving experience, and the relevance of laws to the rider constitute why motorcyclists do what they do and when they do it. The influential features relate to activities on the road as well as in training programs. They structure the "social" elements of motorcycle riding.

Our next step is to create a pattern of action from the multiplicity of voices spoken from different perspectives. To this end we have developed a series of recommendations which we believe take careful account of the findings. They are organized according to relevant topics.

Motorcycle Rider Training Programs

The research suggested that rider training programs in-use, that is, the program as practised by trainers and students, may tend to focus primarily on well-defined motorcycling skills for the purpose of passing a skills test. Limited attention is placed on the character of riding, meaning of safety, shared images of motorcyclists and road users, personal experience, lifestyle, psychology of confidence, apprehension and fright, sociology of group identification, and person-machine relationships.

A review of the statistical findings allows us to conclude that lack of riding skill is not the major problem. Attitude, personality and awareness of others are. Based on these generalized conclusions we recommend that:

- Motorcycle rider training courses should be more attentive to education than training. One should understand the social and existential conditions of riding, the influence of experience, images, and expectations on motorcycling and learn about structural determinants of choice and decisions, to enhance a greater likelihood for safer riding practices. There should be an emphasis on identifying potentially hazardous situations and avoiding them rather than on simply how to control the bike.
- Motorcycle riding training courses should use instructors who are better prepared to implement the education-oriented programs.

Motorcycle rider training programs tend to be offered in areas where the demographics are most viable in terms of population and the pool of training candidates. This presents a scenario whereby many possible trainees do not have ready access to courses. Also, the cost of enrolling in a motorcycle riding training course is quite high, especially for the younger riders who need the education the most. We, therefore, recommend that:

- Motorcycle rider training courses be more accessible geographically to groups of potential trainees who cannot afford the present costs. Motorcyclists who are at high risk by age and riding experience would benefit most by access to courses.

Public Awareness

Generally speaking, the public does not have a positive view of motorcyclists. Although certain aspects of riding may be viewed in an acceptable manner, overall it is safe to suggest that the stereotype motorcyclist is considered dangerous, troublesome and disrespectful of laws and road etiquette. However, in the majority of two-vehicle motorcycle-involved crashes, the motorcyclist was not at fault. In light of this information, we recommend that:

- Motorists be made aware of the motorcyclists on the road—their rights and privileges and of poor motorcycle visibility to other road users. Greater awareness of these factors may contribute to motorists being more observant on the road and more aware of motorcyclist roles.

Motorcyclist Awareness

Motorcyclists ride to be free and individualistic—distant from the external constraints. Their identity relates to the search for autonomy. Being and looking carefree, mildly rebellious and cool, structured in part the motorcyclists' reasons for riding. Safety rules and equipment are products of a society. They reflect compliance, structure and uniformity—qualities which do not overlap with motorcyclists' meaning for riding. The desire of motorcyclists to be free on the road mitigates against co-operating with safety programs. To help address this case we recommend that:

- Motorcycle awareness programs be developed which stress that motorcyclists are not so much masters of their own fate, but rather that they are likely to be the recipients of other motorists' actions. "Freedom to be an individual" does not relate to "freedom from getting involved in a severe crash."

To the extent that motorcycles may be used for social interaction, riders should be made especially aware of the vehicle-control problems associated with alcohol use and of the additional risk associated with carrying a passenger. These factors could also be considered with respect to provisional licensing systems.

Helmets and Other Protective Gear

The helmet-wearing controversy is of immediate relevance to Harley Davidson, sports bike and tour bike operators. They have strong beliefs about the relationship between image and helmets. Harley Davidson riders have deep-rooted feelings against them. Sports bike riders use them because they become an extension of the bike. Tour bike operators tend to wear them primarily because of safety and overall image of low risk-taking. In between there is the majority of undefined riders who tend to follow the overall persona of "cool." Because of this latter group's great numbers, search for identities and lack of solidly defined positions, we recommend that:

- Education and motorcyclist awareness programs stress the concept of cool identity with motorcycle helmet and other safety equipment wearing, using the sport bikers as an example of how helmets, besides being safe, look good. (In Europe the "cool look" has been applied to wearing kidney belts, whereby they are visibly worn by riders to mark individuality with safety.)

Engine Size

For years legislators, insurance companies and safety officials have debated the topic on engine size. In short, does engine size correlate to higher risk and potential for crashes and fatalities. Our research provided some insight on the matter. We suggest that it is not likely the skill or lack of it pertaining to the operation of a "big bike," rather it is the rider's predisposition to select a large motorcycle. Image, thrill-seeking, group affiliation and, to a lesser extent, economics pre-dispose a motorcycle rider to select a certain engine size. Skill to operate a large motorcycle appears to be a less important factor. Accordingly, we recommend that:

- Motorcycle rider training programs pay greater attention to reasons for riding and decision-making for selection of motorcycles.
- Researchers increase their efforts to determine the extent to which predisposition to operate a certain sized motorcycle relates to skill and likelihood of crashes.

* * * * *

Based on the evidence that up to 70% of motorcycle crashes are apparently not primarily the motorcyclists' fault, the following extended response from a motorcycle rider is an appropriate concluding remark:

> Bikes are an anomaly. If it was instilled in the Motor Vehicle Department when you went for your licence and they said, "okay now you had your little training version, here's something else you gotta watch out for—pedestrians, bicyclists and motorcyclists." They have a right to be on the road just like everybody else does. It should be an automatic admission of guilt when somebody gets out of the car and the guy's laying on the road and he says I didn't see him. It should be an automatic admission of guilt that you weren't looking. You gotta be aware of this. It's really easy to spot them. I ride a motorcycle so I'm aware of it. So when I drive my car I'm aware of this. For most people they look for cars, trucks, buses; they don't look for motorcycles.

You see things vacationing on a motorcycle in a way that is completely different from any other. In a car you're always in a compartment, and because you're used to it you don't realize that through that car window everything you see is just more TV. You're a passive observer and it is all moving by you boringly in a frame.

On a cycle the frame is gone. You're completely in contact with it all. You're **in** *the scene, not just watching it anymore, and the sense of presence is overwhelming. That concrete whizzing by five inches below your foot is the real thing, the same stuff you walk on, it's right there, so blurred you can't focus on it, yet you can put your foot down and touch it anytime, and the whole thing, the whole experience, is never removed from immediate consciousness (Robert M. Pirsig,* **Zen and the Art of Motorcycle Maintenance**, *[Toronto: Bantam Books, 1975], 4).*

LIST OF FIGURES

1 The emic, mid-range and etic
2 Types of driver information by source
3 Five-year accident and conviction counts as a function of cumulative totals for different levels of experience
4 Significant interaction effects among variables in the MANOVAS—telephone survey data
5 Average number of accidents and convictions per rider and years of record
6 Significant variables differentiating untrained riders from those who successfully completed training
7 Differences in accident and conviction rates between trained and untrained riders
8 Age distribution for accident-involved motorcyclists by percentage of riders
9 Riding distribution for accident-involved motorcyclists by percentage of riders
10 Motorcycle size preference as a function of rider age
11 Motorcycle size preference as a function of riding/driving experience
12 Average number of convictions per year of vehicle operating experience as a function of riding experience
13 Average number of accidents per year of vehicle operating experience as a function of riding experience
14 Propensity for motorcycle operators to carry passengers as a function of operator age
15 Critical safety-related variables for the general population of riders
16 Critical safety-related variables for accident-involved riders

LIST OF TABLES

1 Completed interviews by motorcycle training group
2 Completed interviews by gender
3 Completed interviews by age category
4 Comparison of age by population
5 Marital status frequencies
6 Frequency of grade 12 graduates among surveyed motorcyclists
7 Frequency of post-secondary graduates among surveyed motorcyclists
8 Frequency distribution of motorcycle riders by rider training status
9 Frequency of reasons for taking a motorcycle training course
10 Frequency of reasons for not taking a motorcycle training course
11 Frequencies of licensed and unlicensed motorcycle riders
12 Cross-tabulation of age by licence type
13 Cross-tabulation of licence type by riding experience
14 Cross-tabulation of riding to work/school by licence type
15 Distribution of motorcycle riding frequency during good weather
16 Cross-tabulation of age by riding frequency in good weather
17 Cross-tabulation of riding experience by frequency of riding
18 Cross-tabulation of predominant riding purpose by frequency of riding in good weather
19 Frequency distribution of percentages of night riding
20 Cross-tabulation of age by percent of time riding at night
21 Cross-tabulation of percent of time riding at night by months riding experience
22 Cross-tabulation of (predominant) riding purpose by percent of time night riding
23 Predominant riding purpose of interviewed motorcycle riders
24 Cross-tabulation of age by riding purpose
25 Cross-tabulation of predominant riding purpose by months riding experience
26 Location of most riding
27 Cross-tabulation of age by location of most riding
28 Cross-tabulation of location of most riding by months riding experience
29 Cross-tabulation of predominant riding purpose by location of most riding
30 Interviewed motorcycle riders by engine size of motorcycle most often ridden

31 Cross-tabulation of age by engine size of motorcycle most frequently ridden
32 Cross-tabulation of engine size by months riding experience
33 Cross-tabulation of predominant riding purpose by motorcycle engine size
34 Cross-tabulation of age by motorcycle ownership
35 Cross-tabulation of riding purpose by ownership of motorcycle most often ridden
36 Age group of formally trained riders by percent or average value of variable category
37 Age group of untrained riders by percent of variable category
38 Training and age group by percent of conviction types
39 Training and age group by percent of accident types
40 Results of canonical correlation analysis between convictions and motorcycle rider characteristics
41 Results of canonical correlation analysis between accidents and motorcycle rider characteristics
42 Results of multiple discriminant analysis on surveyed rider data
43 Age versus accidents and convictions
44 Accidents (0 versus 1+) with convictions included as an independent variable
45 Accidents: convictions included as independent variable
46 Accidents: convictions excluded from independent variables
47 Convictions by alcohol, offender and passenger
48 Accident rate: convictions included as an independent variable
49 Accident rate: convictions excluded from independent variables
50 Conviction rate ($\leq$ 0.3/year versus $>$ 0.3) by alcohol, offender, passenger, age and area

BIBLIOGRAPHY

Chapter 1

Berger, P. **Sociology**. New York: Basic Books, 1975.

Cicourel, A. **Method and Measurement in Sociology**. Free Press of Glencoe: Toronto, 1964.

Geertz, C. **The Interpretations of Culture**. New York: Basic Books, 1973.

Harris, M. **The Nature of Cultural Things**. Toronto: Random House, 1964.

Kuhn, T. **The Structure of Scientific Revolution**. Chicago: Chicago University Press, 1970.

Merton, K. **Social Theory and Social Structure**. Glencoe, Illinois: Free Press, 1957.

Pike, K. **Language in Relation to a Unified Theory of the Structure of Human Behavior**. Glendale: Summer Institute of Linguistics, 1954-60.

Pike, K. "Emic and Etic Standpoints for the Description of Behavior." **Language and Thought** edited by D.C. Hildum. Toronto, Ontario: D. Van Nostrand, 1967.

St. Clair, R., and Giles H. **The Social and Psychological Contexts of Language**. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1980.

Schutz, A. **Collected Papers I: The Problem of Social Reality**. The Hague: Martinus Nijhoff, 1973.

Silverman, D. "Methodology and Meaning." In P. Filmer, M. Phillipson, D. Silverman, and D. Walsh, **New Directions In Sociological Theory**. London: Collier-Macmillan, 1972.

Simmel, G. **Conflict and the Web of Group-Affiliations**. New York: Free Press, 1955.

Thomas, W.I. **Source Book of Social Origins**. Chicago: University of Chicago Press, 1909.

Weber, M. **The Methodology of the Social Sciences**. Glencoe, Illinois: Free Press, 1949.

Chapter 2

Asher, D., and Dodson, B. "The Prediction of Automobile Accidents Following the Senior Year in High School." **Behavioral Research in Highway Safety** 3, no. 1 (1970): 180-194.

Barry, P. **The Role of Inexperience in Motorcycle Crashes**. Chapel Hill, N.C.: Highway Safety Research Center, University of North Carolina, April, 1970.

Beausoleil, L. **A Survey of DND Military and Civilian Motorcycle Owners in Greater Victoria**. Victoria, B.C.: Canadian Forces Base Esquimalt, Dept. of National Defence, June, 1984.

Beausoleil, L. **A Survey of Motorcycle Accidents in the Kingston and Belleville Area**. Kingston, Ontario: Canadian Forces Base Kingston, Dept. of National Defence, November, 1984.

Brown, I. "Exposure and Experience are a confounded nuisance in research on driver behavior." **Accident Analysis and Prevention** 14, no. 5 (1982): 345-352.

Buchanan, L., and Tarrants, W. **Effectiveness and Efficiency in Motorcycle Safety Programs**. Report No. DOT HS-806-133. Washington, D.C.: National Highway Traffic Safety Administration, U.S. Dept. of Transportation, March, 1982.

Campbell, E. "Investigation of Exposure to Risk Factors Among Young Drivers (16-25 years) 1969-1971." **Canadian Journal of Public Health** 63 (1972): 504-507.

Carney, E. **Reduced Risk Driving**. NHTSA Report No. HS-029-696. Motorcycle Safety Foundation, 1980.

Clark, A. "A Social Role Approach To Driver Behavior." **Perceptual and Motor Skills** 42 (1976): 325-326.

Clark, A., and Prolisko, A. **Social-Role Correlates of Driving Accidents**. Report No. HS-029-697. La Trobe University, Melbourne, Australia, Motorcycle Safety Foundation, 1980.

Collins, R. (Abstract Only). **A Longitudinal Study on Effects of Motorcycle Safety Education in Accident Prevention**. Ph.D. disseration, Northern Arizona University, 1979.

Cooper, P. **The Relative Risk of Casualty Involvement for Various Classes of Driver, Vehicle and Roadway in British Columbia**. North Vancouver, B.C.: Insurance Corporation of British Columbia, 1985.

Council, F., Desper, L., and Dutt, A. **Driver Education for Motorcycle Operation: Final Report**. Chapel Hill, N.C.: Highway Safety Research Center, December, 1978.

Craske, S. "A Study of the Relationship Between Personality And Accident History." **British Journal of Medical Psychology** 41 (1968): 339-404.

Donovan, D.; Marlatt, G.; and Salzberg, P. "Drinking behavior, personality factors and high-risk driving: A review and theoretical formulation." **Journal of Studies on Alcohol** 44, no. 3 (1983): 395-428.

Doolittle, R.; Brown, R.; and Boshell, A. "Adolescents and Motorcycle Safety: The Case for Health Advocacy." **Pediatrics** 64, no. 6 (1979): 963-965.

Dwyer, E., and McCord, T. **New York State Motorcycle Rider Education Evaluation Project**. Mimeographed overview of preliminary results, 1985.

English, R. "New Image Bikers Boost Sales." **Financial Post**. June 5, 1982.

Evans, L., and Wasielewski, P. "Risky driving related to driver and vehicle characteristics." **Accident Analysis and Prevention** 15, no. 2 (1983): 121-136.

Fahner, G., and Hane, M. "Seat Belts: Factors Influencing Their Use." **Accident Analysis and Prevention** 5(1973): 27-43.

Finch, J., and Smith, J. **Psychiatric and Legal Aspects of Automobile Fatalities**. Springfield, Ill.: Charles C. Thomas, 1970.

Harrington, D. "The Young Driver Follow-Up Study—An Evaluation of the Role of Human Factors in the First Four Years of Driving." **Accident Analysis and Prevention** 4 (1972): 191-240.

Helsing, K., and Comstock, G. "What kinds of people do not use seat belts?" **American Journal of Public Health** 67, no. 11 (1977): 1043-1049.

Hurt, H.; Ouellet, J.; and Thom, D. Summary of findings reprinted from: **Motorcycle Accident Cause Factors and Identification of Countermeasures, Vol. I Technical Report**. Traffic Safety Center, University of Southern California, Los Angeles, California 90007, Contract No. DOT HS-5-01160, January, 1981 (Final Report).

Insurance Institute For Highway Safety. **Motorcycles**. Fact sheet distributed by the Insurance Institute For Highway Safety, Washington, D.C., September, 1986.

Johnson, D., and Hampton, G. **A Comparative Study of the Behavioral Characteristics of Motorcycle and Non-Motorcycle Motor Vehicle Operators**. NHTSA Report No. HS-840-006. Springfield, Illinois: Office of Superintendent of Public Instruction, Safety Education Unit, Project No. SEE 35-010-69, August, 1970.

Jonah, B.; Dawson, N.; and Bragg, B. "Are Formally Trained Motorcyclists Safer?" **Accident Analysis and Prevention** 14, no. 4 (1982): 247-255.

Jonah, B. **Accident Risk and Risk-Taking Behavior Among Young Drivers**. A paper presented at conference on Risk-Taking in Adolescent Drivers, University of B.C., Vancouver, November, 1984.

Laberge-Nadeau, C., and Potvin, L. **Formal Driver Training: A review of the literature and the state of the art in Canada**. Health and Welfare Canada (Sante et Bien-etre Social Canada), Project No. 6605-1900-42, Centre de Recherche Sur Les Transports, University de Montreal, June, 1983.

Lohrmann, B. **An Evaluation of the Effectiveness of the Motorcycle Training Program Taught by Canada Safety Council in British Columbia**. Unpublished report, School of Public Administration, University of Victoria, February, 1986.

McGuire, F. **Personality Factors In Highway Accidents**. Human Factors 18 no. 5 (1976): 433-422.

McGuire, F., and Kersh, R. **An Evaluation of Driver Education: A Study of History, Philosophy, Research Methodology and Effectiveness in the Field of Driver Education**. Berkeley, Los Angeles: University of California Press, 1969.

MacMillan, J. **Deviant Drivers**. Lexington, Mass.: Lexington Books, D.C. Health and Co., 1975.

McMillan, B. **Demographics of the Safety Course Participant**. Motorcycle Safety Foundation. NHTSA Report No. HS-029664, 1980.

Mayer, R., and Treat, J. "Psychological, Social and Cognitive Characteristics of High-Risk Drivers: A Pilot Study." **Accident Analysis and Prevention** 9, (1977): 1-8.

Mayhew, D. **Motorcycle Accidents: The Problem and Its Solutions**. Ottawa, Ontario: Traffic Injury Research Foundation of Canada. Paper presented at the 21st Annual Meeting of TIRF. Montreal, June 28, 1984.

Mortimer, R. "Evaluation of the Motorcycle Rider Course." **Accident Analysis and Prevention** 16, no. 1 (1984): 63-71.

Motor Vehicle Department. **1984/85 Annual Report**. Victoria, B.C.: Ministry of Transportation and Highways, Province of British Columbia, 1986.

Motor Vehicle Department. **Statistics 1985**. Victoria, B.C.: Ministry of Transportation and Highways, Province of British Columbia, 1986.

Motorcycle Safety Foundation. **Motorcycle Rider Education**. Chadds Ford, Pennsylvania, 1982.

Naatanen, R., and Summala, H. **Road-user Behavior and Traffic Accidents**. Amsterdam/Oxford: North-Holland Publishing Company, 1976.

Nagayama, Y. "An Analysis of Accidents Involving Motorcycles and Suggestion For Drivers' Education." **IATSS Research** 8 (1984): 28-39.

National Highway Traffic Safety Administration, U.S. Department of Transportation. **The Driver Education Evaluation Program (DEEP) Study**. A Report to Congress, July, 1975.

National Safety Council. **Motorcycle Facts**. NHTSA Report No. HS-013-129. September, 1972.

Nicholi, A. "The Motorcycle Syndrome." **American Journal of Psychiatry** 126, no. 11 (1970). NHTSA Report No. HS-010-273.

Osga, G. **An Investigation of the Riding Experiences of MSF Rider Course Participants in South Dakota**. Human Factors Laboratory, University of South Dakota, Vermillion, S.D., 1980.

Osga, G., and Ellingstead, V. **An Evaluation of the Effectiveness of the 1978 South Dakota Motorcycle Rider Course Program**. Report No. HFL-78-9, Final Report, December, 1978.

Rahe, R. **Life Crisis In Health Change**. San Diego: Bureau of Medicine and Surgery, Report No. 2, 1968.

Rainey, R.; Conger, J.; and Walsmith, C. "Personality characteristics as a selective factor in driver education." **Highway Research Board Bulletin** 285 (1961): 23-28.

Raymond, S., and Tatum, S. **An Evaluation of the Effectiveness of the RAC/ACU Motorcycle Training Scheme**. Road Safety Research Unit, Dept. of Civil Engineering, University of Salford, 1977.

Rothe, J.P. **Defining Traffic Safety Education**. Mimeographed. North Vancouver, B.C.: Insurance Corporation of British Columbia, 1982.

Satten, R. "Analysis and Evaluation of the Motorcycle Rider Course in Thirteen Northern Illinois Counties." **International Motorcycle Safety Conference Proceedings** 1 (1980): 145-194. Washington, D.C. HS-031-132.

Shaoul, J. **The Use of Accidents and Traffic Offences as Criteria for Evaluating Courses in Driver Education**. Road Safety Research Unit, Dept. of Civil Engineering, University of Salford, 1975.

Shinar, D. **Psychology on the Road: The Human Factor in Traffic Safety**. Toronto: John Wiley & Sons, 1978.

Simpson, H., and Mayew, D. **Motorcycle Engine Size and Collision Involvement**. Ottawa, Ontario: Traffic Injury Research Foundation of Canada, 1984.

Sterling-Smith, R., and Fell, J. **Special accident investigation studies: The role of alcohol/drug involvement**. Paper presented at the 16th Annual Conference, AAAM, Chapel Hill, N.C., October, 1972.

Stock, J.; Weaver, J.; Ray, H.; Brink, J.; and Sadof, M. **Evaluation of Safe Performance Secondary School Driver Education Curriculum Demonstration Project**. Columbus, Ohio: Battelle Columbus Laboratories, NHTSA, U.S. Dept. of Transportation, Contract No. DOT HS-6-01462.

Thackray, R., and Prescott, J. **Field Test of the Motorcycle Rider Course.** Denver, Colorado: Applied Science Associates, Inc., May, 1980.

Tillman, W., and Hobbs, G., "The Accident-Prone Automobile Driver: A Study Of The Psychiatric And Social Background." **American Journal of Psychiatry** 106 (1949): 321-331.

Traffic Injury Research Foundation of Canada. **Motorcycle Accidents: Ottawa Area: 1967.** Ottawa, Ontario: TIRF, 1967.

Waller, P. "The Youthful Driver: Some Characteristics and Comparisons." **Behavioral Research in Highway Safety** 1, no. 3 (1970): 143-153.

Waller, P.; Reinfurt, D.; Reifler, C.; and Koch, G. **Motorcycles versus Automobiles: How do their owners differ?** Chapel Hill, N.C.: Highway Safety Research Center, University of North Carolina, June, 1969 (HSRCTR11).

Waller, P., and Hall, R. "Literacy—A Human Factor in Driving Performance." **Accident Causation**. Society for Automotive Engineers, Warrendale, PA.: February, 1980.

Zylman, R. "Drivers' Records: Are they a valid measure of driving behavior?" **Accident Analysis and Prevention** 4, (1972): 333-349.

Chapter 3

Bierstedt, R. **The Social Order**. New York: McGraw-Hill, 1974.

Burke, K. **A Grammar of Motives**. New York: Prentice-Hall, 1945.

Cooley, C. **Heredity and Environment**. Journal of Applied Sociology 10, no. 4 (1926).

Cooley, C. **Sociological Theory and Social Research**. New York: Holt, Rinehart and Winston, 1930.

Gilbert, N., and Mulkay, M. **Opening Pandora's Box: A Sociological Analysis of Scientists' Discourse**. Cambridge: Cambridge University Press, 1984.

Goffman, I. **Encounters**. Indianapolis: Bobbs-Merill, 1961.

Goffman, I. **Stigma**. Englewood Cliffs, New Jersey: Prentice-Hall, 1963.

Goodman, N. "Art and Inquiry." In **Aesthetics Today** edited by M. Philipson and P. Gudel. New York: New American Library, 1980.

Green, J., and Wallat, C. **Ethnography and Language in Educational Settings**. Norwood, N.J.: Ablex Publishing Co., 1981.

Gross, E., and Stone, G. "Embarrassment and the Analysis of Role Requirements." In **Social Encounters** edited by M. Argyle. Middlegender, Eng.: Penguin Books, 1973.

Laing, R. **Self and Others**. Hammandsworth, Middlegender, Eng: Penguin Books, 1969.

Lyman, S., and Scott, M. **A Sociology of the Absurd**. New York: Appleton-Century-Crafts, 1970.

McKeachnie, W. "Lipstick as a Determiner of First Impressions of Personality" In **Social Perception** edited by H. Toch and C. Smith. Princeton, N.J.: D. Van Nostrand Co. Inc., 1968.

Maslow, A. **Motivation and Personality**. New York: Harper, 1954.

Mead, G. **Mind, Self and Society**. Chicago: University of Chicago Press, 1934.

Mead, G. **On Social Psychology**. Chicago: University of Chicago Press, 1964.

Morris, M. **An Excursion Into Creative Sociology**. Oxford: Basil Blackwell, 1977.

Newman, J. **Motorcycle Helmets: Who Needs Them?** Ottawa: Canadian Conference of Motor Transport Administrators, 1982.

Reynolds, T., and Futman, J. "Advertising As Image Management." **Journal of Advertising Research** 24 (1984).

Ricouer, P. **The Conflict of Interpretations**. Evanston, Ill.: Northwestern University Press, 1974.

Schachter, S. **The Psychology of Affiliation: Experimental Studies of The Sources of Gregariousness**. Stanford, California: Stanford University Press, 1959.

Schutz, A. **Collected Papers I**. The Hague: Martinus Nijhof, 1973.

Stone, G. "Appearance and the Self" In **Human Behaviour and Social Processes** edited by A. Rose. New York: Houghton Mufflin, 1962.

Timasheff, N. **Sociological Theory: Its Nature and Growth**. New York: Randon House, 1955.

Willis, P. **Profane Culture**. London: Routledge and Kegan, Paul, 1978.

Willis, P. "The Triple-X Boys." **New Society** 29, 1973.

Chapter 5

Jonah, B.; Dawson, N.; and Bragg, B. "Are Formally Trained Motorcyclists Safer?" **Accident Analysis and Prevention** 14, no. 4 (1982): 247-255.

MacMillan, B. **Demographics of the Safety Course Participant**. Motorcycle Safety Foundation. NHTSA Report HS-029664, 1980.

Mortimer, R. "Evaluation of the Motorcycle Rider Course" **Accident Analysis and Prevention** 16, no. 1 (1984): 63-71.

Pedhazur, E.J. **Multiple Regression in Behavioral Research**. Second Edition. Toronto: Holt, Rinehart and Winston, 1982.

Stock, J.R.; Weaver, J.K.; Ray, H.W.; Brink, J.R.; and Sadof, M.G. **Evaluation of Safe Performance Secondary School Driver Education Curriculum Demonstration Project**. NHTSA Contract no. DOT-HS-6-01462. Final Report, June, 1983.

Tabachnick, B.G., and Fidell, L.S. **Using Multivariate Statistics**. New York: Harper and Row, 1983.

Chapter 6

Bragg, B.; Dawson, N.; and Jonah, B. "Profile of the Accident Involved Motorcyclist in Canada." **Proceedings of the International Motorcycle Safety Conference**. Linthicum, Maryland (1980): 1131-1151.

Burke Marketing Research Inc. **Motorcycle Owner Demographics, Insurance and Financing**. A report prepared for the Motorcycle Industry Council, 1980.

Cooper, P. **The Relative Risk of Casualty Accident Involvement for Various Classes of Driver, Vehicle and Roadway in British Columbia**. North Vancouver, B.C.: Insurance Corporation of British Columbia, 1985.

Dwyer, E., and McCord, T. **New York State Motorcycle Rider Education Evaluation Project**.

Hurt, H.; Ouellet, J.; and Thom, D. Summary of findings reprinted from: **Motorcycle Accident Cause Factors and Identification of Countermeasures, Vol. I, Technical Report**. Traffic Safety Center, University of Southern California, Los Angeles, January, 1981.

Johnson, D., and Hampton, G. **A Comparative Study of the Behavioral Characteristics of Motorcycle and Non-Motorcycle Motor Vehicle Operators**. Springfield, Illinois: Office of the Superintendent of Public Instruction, Safety Education Unit, August, 1970.

Kelowna and District Safety Council. **Unpublished report of a Motorcycle Training and Awareness Survey**. Motorcycle Safety Team, Kelowna, B.C., 1983.

Mercer, G.W. **Traffic Accident Frequency, Traffic Convictions, Driver Age and Driver Gender**. Counter Attack Program, Ministry of Attorney General, Vancouver, B.C., 1986.

Mortimer, R. "Evaluation of the Motorcycle Rider Course," **Accident Analysis and Prevention** 16, no. 1 (1984): 63-71.

Ontario Ministry of Transportation and Communications. **Ontario Trends in Motorcycle Accidents**. Transportation Regulation Development Branch, Downsview, Ontario, 1983.

Rothe, J.P. et al. **Rethinking Young Drivers**. North Vancouver, B.C.: Insurance Corporation of British Columbia, 1987.

Simpson, H., and Mayhew, M. **Motorcycle Engine Size and Collision Involvement**. Ottawa, Ont.: Traffic Injury Research Foundation of Canada, 1984.

Stewart, D., and Sanderson, R. **The Measurement of Risk on Canada's Roads and Highways**. Symposium on Risk in Transport, University of Waterloo, Ontario, December 6, 1983.

Stock, J.; Weaver, J.; Ray, H.; Brink, J.; and Sadof, M. **Evaluation of Safe Performance Secondary School Driver Education Curriculum Demonstration Project**. Report DOT HS-806 568, U.S. Department of Transportation, Washington, D.C., 1983.

GLOSSARY

Accident: For consistency throughout the text, the term "accident" is synonymous with the terms "crash" or "collision."

Canonical Analysis (CA): A general analytical approach that subsumes multiple regression, discriminant analysis and multivariate analysis of variance. Canonical correlation is an extension of multiple regression in that relationships among multiple dependent variables are also considered in the same analysis.

Discriminant Analysis (DA): Discriminates groups from one another on the basis of sets of measures where the data are partitioned into groups based on values of a dependent or "class" variable. DA determines which independent variables can then significantly explain the groupings.

Displacement: Refers to engine capacity or size (i.e., the number of cc).

Emic: The emic reflects the everyday life of an individual. It is concerned with the study of behavior happening in a social situation.

Etic: The etic is further removed from the social situation. It is derived from sources external to the phenomena and previous to their investigation.

Incident: A general term used in the text to signify an accident, crash or traffic violation.

Kurtosis: Refers to the flatness or peakedness of a frequency distribution.

MANOVA: The statistical technique known as "multivariate analysis of variance" which is used to determine whether the differences among two or more sample means are greater than would be expected by chance alone. (This method of statistical inference evaluates whether there is any systematic or non-random difference among the means in comparison to the within-sample variances.) It is an extension of univariate analysis of variance designed to test simultaneous differences among groups or multiple dependent variables.

Mid-range: Refers to "general knowledge" about a group studied, particularly about how people perceive and interpret their activities.

Motorcycle: A vehicle that has steering handlebars, a minimum seat height of 650 mm, a minimum wheel rim diameter size of 10, a minimum wheelbase of 1,000 mm, an engine size of 100 cc or more, and is designed to travel on not more than three wheels in contact with the ground.

NHTSA: Abbreviation for National Highway Traffic Safety Administration—a United States government agency.

Play the clutch: A situation where the clutch is partially engaged to find the friction point in conjunction with the throttle.

Press the throttle: Jargon for applying more fuel to increase the engine rpm by "rotating" the throttle handle.

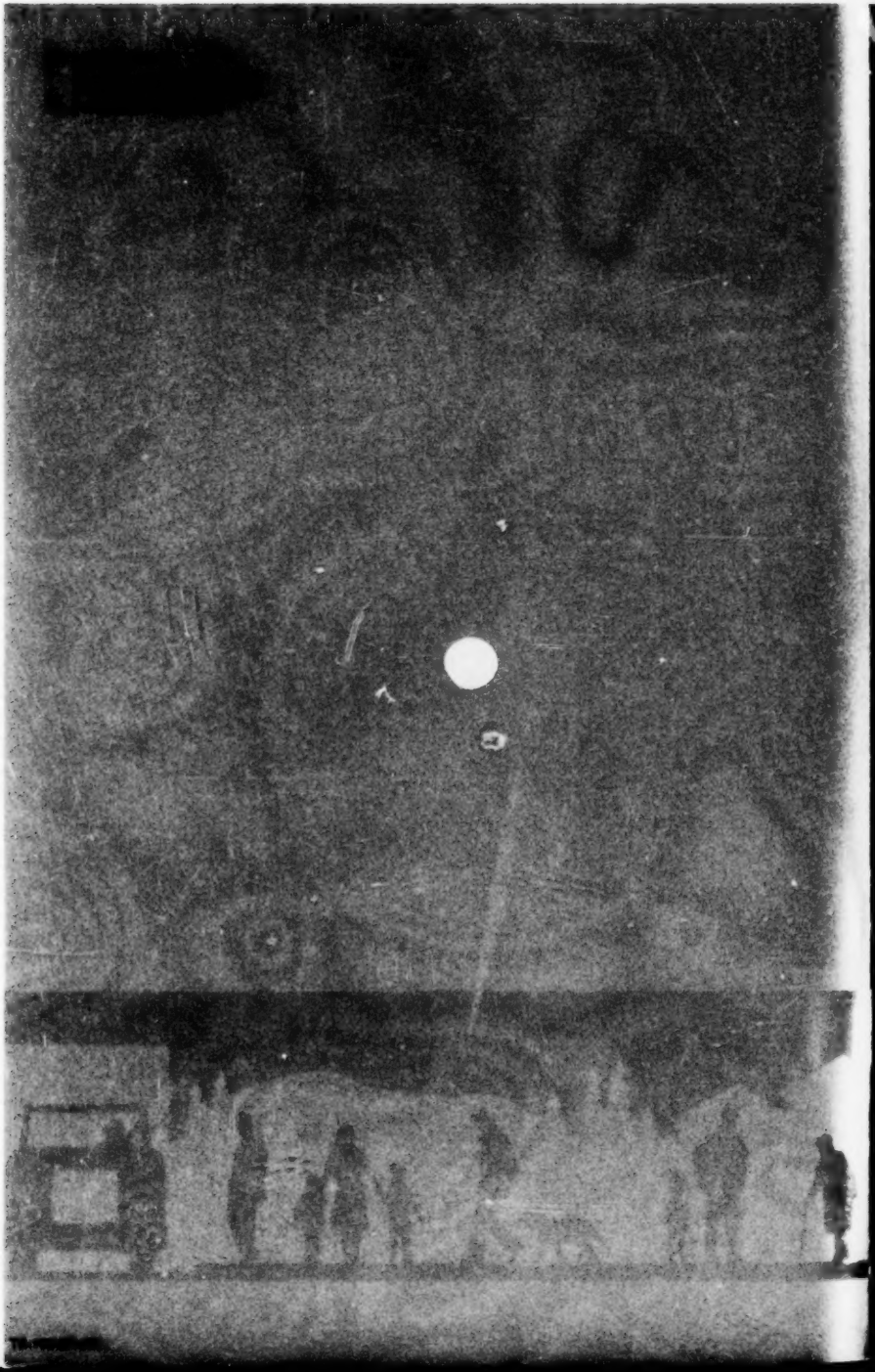
Rider: Refers primarily to the operator of a motorcycle but, where indicated in the text, may include a passenger.

SAS: Statistical Analysis System—a computer software package for data analysis.

SPSS—PC +: Statistical Package for the Social Sciences—the personal computer software version.

Skewness: Refers to the symmetry or asymmetry of the frequency distribution.

Slide Out: A situation where a motorcyclist loses control of the bike and it slides out beneath the rider or falls down during angular movement.

Space Cushion: The area that motorcycles build around them for increased safety.

Wertrational: A social action where a series of activities are organized around institutional norms and practices.